Total No. of Questions : 12]

SEAT No. :

P2821

[Total No. of Pages : 3

[5354] - 1

B.E. (Civil) (Semester - I)

ENVIRONMENTAL ENGINEERING - II

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat figures wherever necessary.***
4) ***Assume necessary data.***
5) ***Use of scientific calculator is allowed.***

Q1) a) What is TOC, COD and BOD? Explain relationship between them. **[6]**

b) What is dry weather flow? What are the sources of it? State the factors affecting dry weather flow. **[4]**

c) State various formulae used for computing velocity of flow in sewer. **[6]**

OR

Q2) a) Enlist factors to be considered while selecting sewer material. Explain concrete sewers. **[6]**

b) Define self cleansing velocity and explain its importance in sewer design. **[4]**

c) Mention Physical, chemical and biological characteristics of sewage. **[6]**

P.T.O.

Q3) a) What are the different types of velocity control devices used in grit chamber? Explain any two with neat sketch. **[4]**

b) B.O.D. of a sewage incubated for one day at 30ºC has been found to be 150mg/l. What will be its 5 day 20ºC BOD, if K at 30ºC is 0.16 per day (base 10). **[6]**

c) Explain screening with respect to : **[6]**

i) Necessity.

ii) Types of screen.

OR

Q4) a) Draw and explain of Process flow diagram for sewage treatment. **[6]**

b) Determine the BOD of river mix on the downstream of point of disposal if sewage of 4MLD, having BOD_5 of 240 mg/lit is discharged in a river. The discharge in the river is 0.4 m^3/s having BOD_5 of 3mg/lit. **[5]**

c) Write down Streeter-Phelps equation and explain its terminology. **[5]**

Q5) a) Write Short Note : Important microorganisms in waste water treatment system. **[6]**

b) Define : **[6]**

i) Sludge Volume Index (SVI).

ii) Return sludge ratio.

c) Explain the working of rotating biological contactors. **[6]**

OR

Q6) a) Define : **[6]**

i) Sludge bulking.

ii) Mean cell residence time.

b) Write short note on rotating biological contractors. **[6]**

c) Give the merits & demerits of conventional trickling filter. **[6]**

Q7) a) Write short note on : Phytoremediation technology for wastewater treatment and root zone cleaning system. **[8]**

b) Explain the principle of working of aerated lagoon. Also state the merits and demerits over aerated lagoon. **[8]**

OR

Q8) a) Differentiate between oxidation pond and aerated lagoon, with reference to HRT, organic loading method of aeration and operation cost. **[8]**

b) Write short note : Principle, types, advantages & disadvantages of oxidation pond. **[8]**

Q9) a) Write short note on UASB - Principal, advantages and disadvantages. **[6]**

b) Explain steps involved in design of septic tank. **[6]**

c) Explain factors governing anaerobic digestion. **[6]**

OR

Q10) a) Explain septs involved in anaerobic digester. **[6]**

b) What are the method of treatment & disposal of septic tank effluent? **[6]**

c) Explain methods of sludge treatment and disposal. **[6]**

Q11) Give the range of important characteristics of waste water from following industry and draw a suitable flow diagram for treatment for each industry. **[18]**

a) Textile industry.

b) Paper and pulp industry.

c) Distillery industry.

OR

Q12) Give the range of important characteristics of waste water from following industry and draw a suitable flow diagram for treatment for each industry. **[18]**

a) Distillery industry.

b) Sugar industry.

c) Dairy industry.

Total No. of Questions : 12]

SEAT No. :

P2829

[Total No. of Pages : 3

[5354] - 10

B.E. (Civil Engineering) (Semester - II)

HYDROINFORMATICS

(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare numerical modeling and soft computing modeling in Hydroinformatics. **[6]**

b) Enlist the basic scientific disciplines of hydro informatics and explain important aspects of each on which hydro informatics is based. **[6]**

c) What are components of Hydroinformatics systems? Explain in detail different hardware and software components of Hydroinformatics systems. **[6]**

OR

Q2) a) Discuss the role of internet in rainfall forecasting system. **[6]**

b) Discuss any web based hydroinformatics system in India or abroad giving details about scope, purpose, underlying model, software used in front end and back end. **[6]**

c) Explain role of numerical modeling in Hydroinformatics. **[6]**

P.T.O.

Q3) a) Name different softwares used in Hydroinformatics. Explain any one of them in detail. **[8]**

b) What is a decision support system in water resources engineering? What are its components? What is the role of government sector in decision support system? **[8]**

OR

Q4) a) You have to design a graphical user interface for flood forecasting system, explain the front end and back end parameters. **[8]**

b) A multi-criterion decision support systems is to be designed to collect information regarding availability of water resources viz. surface water, ground water, etc. in a district, frame various alternative schemes. **[8]**

Q5) a) Discuss design of simulation model for water release from a dam with respect to objective, scope, basic formulae used, underlying solution procedure, simulation technique used. **[8]**

b) Discuss design of simulation model for household sewage collection system giving details of objective, scope, basic formulae used, underlying solution procedure, simulation technique used. **[8]**

OR

Q6) a) Discuss any commercial simulation model for two dimensional flow modeling. **[8]**

b) Discuss design of simulation model for water release from a canal for navigation purpose with respect to objective, scope, basic formulae used, underlying solution procedure, simulation technique used. **[8]**

SECTION - II

Q7) a) What is over fitting of neural network? Explain in detail how it is avoided? **[6]**

b) What is back propagation? Why it is slow compared to conjugate gradient algorithm? **[6]**

c) What are the stopping conditions for the algorithm? What will be the probable effects of different stopping conditions on performance of a model. **[6]**

OR

Q8) a) Discuss conjugate gradient algorithm in detail. **[6]**

b) Enlist any four transfer functions with their sketches. **[6]**

c) Write detailed note on recurrent network. **[6]**

Q9) a) What is evolutionary computing? Explain 3 criteria for evolutionary process to occur. What are different types of evolutionary computing? **[8]**

b) Discuss Fitness function, population, terminals and functions in connection with the Genetic Algorithm. **[8]**

OR

Q10) a) What is mutation and cross over? Give an example of both by drawing the tree diagram. **[8]**

b) What are the steps in implementation of Genetic Algorithm? **[8]**

Q11) a) Write detail note on applications of Artificial Neural Networks in stage discharge modeling. **[8]**

b) Discuss a study about application of Genetic Algorithm in Water Resources Engineering giving details about problem definition, objective, data, inputs, outputs and results. **[8]**

OR

Q12) a) Write any case study of ground water modeling using Artificial Neural Network. **[8]**

b) How applications of Genetic Algorithm are useful in water Resources development projects. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2889

[Total No. of Pages :2

[5354]-100

B.E. (Electronics)

SYSTEM ON CHIP

(2008 Pattern) (Elective -II) (Theory) (Paper - Soc)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from section-I and 3 questions form section-II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1)a) What Common methods, principles and process sequence do the IC and MEMS fabrications have? **[8]**

b) Discuss the various scaling design issues. **[8]**

OR

Q2) a) Elaborate in depth, the scaling properties in MEMS design. **[8]**

b) Explain the stepwise flow of micro-machining process. **[8]**

Q3) a) Discuss the various analog controls of MEMS design. **[8]**

b) Compare the sliding controls and digital controls of MEMS. **[8]**

OR

Q4) a) List the properties and applications of piezo electric materials. **[8]**

b) Explain the material selection strategy for a typical MEMS design. **[8]**

P.T.O.

Q5) a) Write a technical note on MEMS biosensors **[9]**

b) Describe the principle operation and fabrication process of electromagnetic and thermal micro actuators. **[9]**

OR

Q6) a) Explain the principle of molecule based biosensors. **[9]**

b) Describe the principle operation and applications of MEMS chemical sensors. **[9]**

SECTION - II

Q7) a) List the properties and applications of piezo electric materials. **[8]**

b) What are the associated compilation techniques for digital media **[8]**

OR

Q8) a) Explain the SOC design flow in detail. **[8]**

b) With suitable diagram explain the principles of piezo electric micro cantilever beam. **[8]**

Q9) a) What are the advantages and disadvantages of behavioral synthesis. **[8]**

b) What is testability? Explain its importance in ASIC design. **[8]**

OR

*Q10)*a) Write a short a technical note on FPGA synthesis. **[8]**

b) Give the general overview of physical design automation. **[8]**

*Q11)*a) Explain in detail the system portioning. **[9]**

b) What is DFT and how it is important in a system design. **[9]**

OR

*Q12)*a) with proper example explain the stuk at fault model. **[9]**

b) Write a note on embedded core based system on chip test strategies **[9]**

Total No. of Questions : 12]

SEAT No. :

P2890

[Total No. of Pages :3

[5354]-101

B.E. (Electronics)

ROBOTICS AND AUTOMATION

(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from section. I and section II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagram must be drawn wherever necessary.***

SECTION - I

Q1) a) Define ROBOTICS and explain the generations of Robotics. **[8]**

b) What are the "Three Rules (or Laws) of the Robotics"? **[4]**

c) What are the major components of the Robots. Explain any three. **[6]**

OR

Q2) a) Write and explain any two Industrial applications of the robots. **[4]**

b) What is 'Work Envelop'. Explain in brief. **[6]**

c) Explain Pitch, Roll and Yaw with example **[8]**

Q3) a) Define "Degree of Freedom". Explain. **[4]**

b) Explain (Any Two): **[6]**

i) Cylindrical Coordinate system.

ii) Spherical Coordinate system.

iii) Cartesian Coordinate system.

c) What is 'Work Space'? Explain Reachable workspace. **[6]**

OR

P.T.O.

Q4) a) State and explain the Newton-Euler Equation. Explain its significance. **[6]**

b) What are the steps to get DH parameters. **[6]**

c) What is Kane's algorithm? What are the benefits of it. **[4]**

Q5) a) Write Note on : i) Mechanical Griper ii) Pneumatic Griper (Any One) **[4]**

b) Diffèrentiate Serial and Parallel Robots. **[4]**

c) Explain in Brief: (Any Four) **[8]**

i) AC Motor.

ii) Servo Motor

iii) DC Motor

iv) Ultrasonic Sensor

v) Proximity Sensor

vi) Tactile Sensor.

OR

Q6) a) Write short note on (Any two) **[8]**

i) Gears,

ii) Rack and Pinion

iii) Slider Crack Mechanisms

b) Explain **[4]**

i) Single acting cylinder

ii) Double acting cylinder

c) What is Optical Encoders, explain in brief **[4]**

SECTION - II

Q7) a) Explain (Any Two) **[4]**

i) Continuous Path.

ii) Via Points.

iii) Programmed Points.

b) What do mean by Error Budgeting. What are the parameters related to it. **[6]**

c) What do you mean by the following features or the ability of the Robots. (Any 4) **[8]**

i) Ability to define points in space.

ii) Ability to move between points.

iii) Program control

iv) Control of end effèctors.

v) Serviceability

OR

Q8) a) What is PATH planning. What is Trajectory. **[4]**

b) What is Jacobian Matrix. Write Jacobian from of DH matrix. **[8]**

c) What do you mean by Denavit - Hartenberg Matrix, explain in brief. **[6]**

Q9) a) What are Vision sensors. Explain Robotic Vision system for material handling . **[4]**

b) Explain Point, Line and Planer Sensor with examples **[4]**

c) Explain the following image segmentation techniques with example **[8]**

i) Edge Detection.

ii) Contour Following.

OR

Q10)a) State and explain the following sensors, give examples of each sensors (any Two) **[8]**

i) Object detection sensor

ii) GAS sensor

iii) Noncontact sensors.

b) What is Video Analytics. Give its benefits in road traffic management.**[8]**

Q11)a) What are the levels of Robotics automations. Explain how the product quality is measured by the level of automations. **[8]**

b) What are the standard components in a Robot based Inspection system. **[8]**

OR

Q12)a) Explain in brief (Any Two) **[8]**

i) PLC

ii) DCS system

iii) SCADA

iv) HMI

b) State and explain any one Home Automation system. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2891

[Total No. of Pages :3

[5354]-102

B.E. (Electronics Engineering)

COMPUTER NETWORK & SECURITY

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from section. I and Three questions form section II.***
2) ***Answers to two section should be written in separate answer-books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the OSI-ISO Model with suitable diagram. **[8]**

b) Explain the software designing issues for the layers. **[6]**

c) What are the uses of computer networks. **[2]**

OR

Q2) a) Explain the TCP/IP Reference model and compare with OSI Model. **[8]**

b) What are the service primitives and explain the relationship of services to the protocols. **[6]**

c) What is role of port address in computer networking. **[2]**

Q3) a) Write short notes (any thre) **[18]**

i) BOOTP

ii) RPC

iii) P2P File sharing

iv) DNS Server

OR

P.T.O.

Q4) a) Explain the Telnet and FTP in details with respective to client server Communication. **[9]**

b) Explain the SMTP with suitable diagram **[9]**

Q5) a) Compare connection oriented Vs connectionless services of transport layer. **[4]**

b) Explain the connection establishment using three way handshaking in TCP Protocol. **[8]**

c) Compare IPv4 Vs IPv6. **[4]**

OR

Q6) a) What is congestion control? What are the types congestion control? Explain the closed loop congestion. Control technique. **[8]**

b) What is routing in camputer networking? Explain the shortest path routing algorithm. **[8]**

SECTION - II

Q7) a) What is framing? What are the types of framing? explain the bit oriented protocol with suitable example. **[8]**

b) Explain the stop and wait automatic repeat request protocol with diagram. **[8]**

OR

Q8) a) Explain with help of diagram the sliding window protocol. **[8]**

b) Explain the point to point protocol with diagram. **[8]**

Q9) a) What is transmission media? What are the types of transmission media? explain guided transmission media. **[10]**

b) A channel has a B.W.=5KHZ and a signal to noise power ratio is 63. Determine the B.W. needed if the S/N Power ratio is reduced to 31 **[6]**

OR

Q10)a) Explain the communication satellite with diagram. **[10]**

b) Compare circuit switched and packet switched networks. **[6]**

Q11)a) What is cryptography? explain the data encryption standard. **[6]**

b) Explain the Hash Function with suitable diagram. **[6]**

c) Explain the substitution ciphers encryption and decryption with help of examples. **[6]**

OR

Q12)a) Explain the RSA Algorithm **[6]**

b) Write short notes (any two) **[12]**

i) X.805 security Architecture

ii) Protocol Analyzer

iii) Internet access through Dial up Modem

Total No. of Questions : 12]

SEAT No. :

P2892

[Total No. of Pages :2

[5354]-103

B.E. (Electronics Engineering)

PROCESS AUTOMATION

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from section. I and 3 questions from section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithamic tables slide rule, mollier charts, electronic pocket calculator and steam table is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1)a) Draw the block diagram of process control system and explain the function of each block. **[8]**

b) Draw a typical flow loop and explain its functioning. **[8]**

OR

Q2) a) Explain the concept of self regulation with the help of the example of liquid level system. **[8]**

b) Draw a typical temperature control loop and explain its functioning. **[8]**

Q3) a) Write the equation of PID controller and realize it using op-amp circuit obtain the output equation for the op-amp based PID controller. **[10]**

b) Explain PID controller tuning by closed loop ultimate cycle method of Ziegler and Nichols. **[8]**

OR

Q4) a) Draw the diagram of pneumatic PI controller and explain its working. **[8]**

b) Explain P,I and D actions of PID controller and write their features. **[10]**

P.T.O.

Q5) a) Compare electronic and pneumatic systems. **[8]**

b) Draw and explain the control valve characteristics. **[8]**

OR

Q6) a) Explain the concept of cavitation and flashing. **[8]**

b) Define the term vangeability and write its relation with flow rates for linear valve and equal percent valve. **[4]**

c) Write a note on control valve sizing. **[4]**

SECTION - II

Q7) a) Explain the concept of feed forward control with the help of block diagram and compare feed forward control with feed back control. **[10]**

b) Explain the concept of internal model control (IMC). Draw its diagram. **[8]**

OR

Q8) a) Draw the block diagram of model reference adaptive. Control (MRAC) and explain its working. **[10]**

b) Explain the two schemes of ratio control. **[8]**

Q9) a) Explain the feed forward control for boiler drum level control. **[8]**

b) Explain cascade control for heat exchanger. **[8]**

OR

Q10)a) Explain feed back control scheme for distillation column. **[8]**

b) What is robot? State its industrial applications and explain any one application. **[8]**

Q11)a) Explain distributed control system (DCS) with the help of block diagram. **[8]**

b) Write a note on Alarm annunciator. **[8]**

OR

Q12)a) Write short notes on **[16]**

i) SCADA

ii) Flow Totalizer

Total No. of Questions : 12]

SEAT No. :

P2893

[Total No. of Pages :3

[5354]-104

B.E. (Electronics)

AUDIO AND VIDEO ENGINEERING (Elective - III)

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer the questions Q.1 or Q.2; Q.3 or Q.4; Q.5 or Q.6 Q.7 or Q.8; Q.9 or Q.10; Q.11 or Q.12.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Use of electronic calculator is allowed.***
5) ***Assume suitable data, if required.***

SECTION - I

Q1)a) Sketch neat diagram of composite video signal indicating all the important signals and time duration. **[6]**

b) Explain the color circle diagram. **[6]**

c) Define and explain the following terms. **[6]**

i) Resolution

ii) Color temperature

iii) Aspect ratio

OR

Q2) a) State the main specifications of CCIR-B standard. **[6]**

b) Explain the concept of additive and subtractive color mixing using neat diagram. **[6]**

c) Explain the term color perception. **[6]**

P.T.O.

Q3) a) Discuss the digital TV signals and parameters associated with it . **[8]**

b) Draw a neat block diagram of color TV remote control and explain function of each block. **[8]**

OR

Q4) a) Explain how the TV alignment and Fault finding is carried out in detail. **[8]**

b) Compare low level transmitter with high level transmitter. **[8]**

Q5) a) Explain the basic principle of digital video compression techniques. state the advantages of compression. **[8]**

b) Enlist the main features of **[8]**

i) MPEG -1

ii) MPEG - 2

iii) MPEG - 4

OR

Q6) a) Explain MAC and advanced MAC signals transmission in detail. **[8]**

b) Draw a neat block schematic of DTV transmitter and explain function of each block. **[8]**

SECTION - II

Q7) a) Explain HDTV encoder using neat block diagram. **[8]**

b) Explain how the digital broadcasting of cricket match is carried out. **[10]**

OR

Q8) a) Draw and explain DTH service with the help of neat block diagram. **[8]**

b) Explain

i) Movie on demand /video on demand

ii) CCTV/CATV in detail. **[10]**

Q9) a) State the advantages and drawbacks of digital recording of sound. Briefly explain DVD player. **[8]**

b) Explain the concept of blue ray disc. **[8]**

OR

Q10) a) Draw a neat block diagram of VCD player and explain main function of each block. **[8]**

b) Explain various audio compression standards. **[8]**

Q11) a) Draw a neat block diagram of chord less microphone system and explain function of each block. **[8]**

b) Explain the following terms- **[8]**

i) Reverberation

ii) Acoustic feedback

iii) Path delays

OR

Q12) Write notes on - **[16]**

a) Acoustic chamber

b) Graphic equalizer

c) Digital filter

d) Satellite video

Total No. of Questions : 12]

SEAT No. :

P2894

[Total No. of Pages :3

[5354]-105

B.E. (Electronics)

IMAGE PROCESSING AND MACHINE VISION

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2; Q.3 or Q.4; Q.5 or Q.6 Q.7 or Q.8; Q.9 or Q.10; Q.11 or Q.12.***
2) ***Answer 3 questions from section I and 3 questions from section II.***
3) ***Answer to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of a block diagram explain the different steps in image digitization. How is digital image represented? **[8]**

b) Write short note on," Elements of Visual Perception" **[8]**

OR

Q2) a) Explain any one technique for Image Acquisition in detail. **[8]**

b) Explain the applications of image processing in remote sensing and medical imaging. **[8]**

Q3) a) What is histogram matching? Give its application and advantages. **[8]**

b) Explain in detail Image enhancement in the frequency domain. **[8]**

OR

Q4) a) Give the matrix of average filter. What are its advantages and disadvantages? **[8]**

b) Write short note on Homomorphic filtering. **[8]**

P.T.O.

Q5) a) Explain segmentation using region splitting and region merging. **[9]**

b) What is skeletonization? Explain how it can be used for image Representation. **[9]**

OR

Q6) a) Write Short note on **[9]**

i) Region based segmentation

ii) Chain codes

b) Discuss in detail how Hough transform is useful in line detection? **[9]**

SECTION - II

Q7) a) With the help of neat block diagram explain Lossless Predictive Coding. **[9]**

b) Write a short note on **[9]**

i) Image compression standards

ii) Wavelet based image compression

OR

Q8) a) What are different redundancies found in digital image for compression? Explain in detail. **[9]**

b) Explain wavelet based compression in detail **[9]**

Q9) a) What is region descriptor? Explain it with examples. **[8]**

b) What are the different useful features for representation of shape? Explain the statistical moments used for shape representation? **[8]**

OR

Q10)a) Explain the contour based shape representation and description of an image. **[8]**

b) How does Fourier Descriptor help in detecting boundaries? Explain with examples. **[8]**

Q11)a)Explain the terms world co-ordinates, camera co-ordinates and image coordinates with respect to single perspective camera. **[8]**

b) Explain the statistical pattern recognition in detail. **[8]**

OR

Q12)a) Compare Statistical and Syntactical approach for object recognition. **[8]**

b) Write short note on Scene reconstruction from multiple views. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2895

[Total No. of Pages :3

[5354]-106

B.E. (Electronics)

OPTICAL AND MICROWAVE COMMUNICATION

(2008 Pattern) (Semester - II) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2; Q.3 or Q.4; Q.5 or Q.6 from section -I and Q.7 or Q.8; Q.9 or Q.10; Q.11 or Q.12 from section-II.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) If a multimode step index fiber with a core refractive index of 1.4917 and that of cladding 1.4894 and wavelength of 1.3 μm. **[8]**

Calculate

i) Numerical aperture

ii) Critical angle of core cladding interface

iii) Number of modes

b) Explain the block diagram of optical fiber communication system in detail. **[8]**

OR

Q2) a) Compare the following terms. **[8]**

i) Step index fiber and Graded index fiber

ii) Pin photodiode and Avalanche photodiode

b) List the characteristics of light sources required in optical communication. **[8]**

P.T.O.

Q3) a) List three major causes of attenuation in an optical fiber and explain their mechanisms. **[8]**

b) When the optical power launched into a 10 km length,fiber is 100 μW, the optical power at fiber output is 5μW. Calculate

i) Overall signal attenuation in dB.

ii) Signal attenuation per km.

iii) The overall signal attenuation for a 12 km optical link using same fiber splices at 1km interval, each giving attenuation of 0.5dB. **[8]**

OR

Q4) a) What are the classes of Optical amplifiers? Explain in brief the two main types of optical amplifiers. **[8]**

b) Write a short note on SONET/SDH optical network. **[8]**

Q5) a) Explain interferometric method of measurement of length in detail. **[8]**

b) Describe Brain Surgery in detail. **[6]**

c) Write a short note on medical applications of lasers. **[4]**

OR

Q6) a) Write short notes on the following. **[12]**

i) Laser melting and trimming of material

ii) Removal of tumours of vocal cards

iii) Moire fringes

b) Describe the various laser instruments used for surgery. **[6]**

SECTION - II

Q7) a) Explain the construction and working of an isolator in detail. **[6]**

b) Explain the properties of H plane tee and give reason why it is called shunt tee. **[6]**

c) For a directional coupler the incident power is 550 mW. Calculate the power in the main arm and auxillary arm. The coupling factor is 30dB.**[4]**

OR

Q8) a) Explain the construction and working of an Circulator in detail. **[6]**

b) Describe any two applications of Magic Tee. **[6]**

c) Write scattering matrix of E plane, H plane and Magic tee. **[4]**

Q9) a) A reflex klystron operates at the peak mode of n = 2 with Vo = 280V, Io = 22mA and a signal voltage V1= 30V. Determine: **[8]**

i) The input power

ii) The output power

iii) Efficiency

b) Explain working of HTWT with the help of suitable diagram. **[6]**

c) Write a short note on Multicavity klystron. **[4]**

OR

Q10)a) Explain the construction and working of Two cavity klystron in detail. **[8]**

b) Explain how oscillations are sustained in cavity magnetron. Assume π mode of oscillations. **[6]**

c) Explain how helical TWT achieves amplification. **[4]**

Q11)a) Explain the construction, working principle of Varactor diode in detail. **[8]**

b) Explain terrestrial and satellite based microwave communication system in detail. **[8]**

OR

Q12) Write short notes on the following along with applications. **[16]**

a) Tunnel diode as an oscillator

b) Operating Modes of Gunn diode

c) Schottky diode

d) PIN diode as an modulator

Total No. of Questions : 12]

SEAT No. :

P4279

[Total No. of Pages : 3

[5354]-108

B.E. (Electronics)

ADVANCED COMMUNICATION SYSTEM

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from Section I and three questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) With the help of neat block diagram explain the operation of mobile system. **[6]**

b) Describe the following w.r.t. mobile environment. **[6]**

i) Propagation loss

ii) multipath fading

c) Discuss Cell Splitting and Frequency Reuse for Spectral Efficiency improvement **[6]**

OR

Q2) a) With suitable example, explain various propagation paths in cellular mobile system. **[6]**

b) Describe the operation of cellular system in detail. **[6]**

c) Write note on Cell Sectorization. **[6]**

Q3) a) Describe Space Diversity antennas. **[8]**

b) Explain near end and far end interference. **[8]**

OR

Q4) a) Differentiate between frequency management and channel assignment with suitable examples? **[8]**

b) Describe delaying a handoff with the help of suitable algorithm. **[8]**

P.T.O.

Q5) a) With neat diagram describe GSM Architecture. **[8]**

b) Explain how dynamic splitting is superior to permanent splitting. **[8]**

OR

Q6) a) Describe the advantages of digital cellular system. **[8]**

b) How cell sites are installed to cover the highway traffic? **[8]**

SECTION - II

Q7) a) What are Kepler's three laws of planetary motion ? Give the mathematical formulation of Kepler's third law. **[8]**

b) With suitable block diagram, discuss Communication subsystem. **[8]**

OR

Q8) a) With the help of suitable block diagram, explain single conversion transponder for 6/4 GH_z band. **[8]**

b) Differentiate between LEO, MEO and GEO satellites. **[8]**

Q9) a) A Ku band satellite uplink has a carrier frequency of 14.125 MH_z and carries a symbol stream at Rs = l6Msps.The transmitter and receiver have RRC filters with α=0.3.What is the frequency range of the transmitted RF signal? **[8]**

b) Describe QPSK modulator and demodulator for satellite communication.**[8]**

OR

Q10)a) What are the various considerations and assumptions while designing the uplink budget? **[8]**

b) Geostationary satellites use L, C, Ku and Ka bands. The path length from an earth station to the GEO satellite is 38,500 km. For this range calculate the path loss in decibels for the following frequencies. **[8]**

i) 6.2 GH_z, 4.0 GH_z

ii) 14.2 GH_z, 12.0 GH_z

Q11) a) Describe schematic of the typical configuration of VSAT earth station. **[9]**

b) Explain Guard times and synchronization in TDMA networks. **[9]**

OR

Q12) Write short notes on following (Any three) **[18]**

i) FDMA

ii) Inter-modulation

iii) TDMA frame structure

iv) Network architectures in VSAT system

Total No. of Questions : 12]

SEAT No. :

P2830

[Total No. of Pages : 2

[5354] - 11
B.E. (Civil)
TQM & MIS IN CIVIL ENGINEERING
(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Name any three Quality Gurus and explain their interpretation of Quality with the help of examples from a building Project. **[18]**

OR

Q2) How is Globalization affecting Quality of Constructions in India? Outline your comments with examples. **[18]**

Q3) Explain the concept of internal and external customer for a construction firm with examples. **[16]**

OR

Q4) Explain with examples: **[16]**

a) Customer Satisfaction.

b) Decision Based on Facts.

c) Involvement of people.

d) System Approach.

P.T.O.

Q5) Explain the term "6 Sigma". Differentiate between "DMAIC" and "DMADV" Methodology. Explain how Black Belt of Six Sigma can be obtained? **[16]**

OR

Q6) What is Supply Chain Management (SCM)? How SCM is important in achieving TQM in construction sector. Explain with examples. **[16]**

SECTION - II

Q7) a) What is Decision Support System (DSS)? State it characteristics. How are they developed? **[9]**

b) State any four applications of MIS in construction management. **[9]**

OR

Q8) a) Explain in brief any three subsystem of any MIS. **[9]**

b) Explain use of an MIS in the management control of Contactor firm in Real estate business. **[9]**

Q9) Explain with a flow diagram the acquisition, segregation, storing, processing and validation of the information necessary to develop a MIS for a road construction firm. **[16]**

OR

Q10) State advantages and limitations of using MIS in construction industry. Explain with examples. **[16]**

Q11) What is ERP? What are it various modules? What are its advantages and limitations? Explain in detail. **[16]**

OR

Q12) Write short notes on: **[16]**

a) Information Security System.

b) Data base Management.

c) Use of ERP software in Construction.

d) Strategic decisions and tactical decisions.

Total No. of Questions : 12]

SEAT No. :

P2897

[Total No. of Pages :3

[5354]-110

B.E. (Electronics) (semester - II)

ARTIFICIAL INTELLIGENCE

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2; Q.3 or Q.4; Q.5 or Q.6 Q.7 or Q.8; Q.9 or Q.10; Q.11 or Q.12 from section-I and section-II.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the different architectures of agents and give at least two examples of agents where these are used. **[10]**

b) Lisit different types of environments and give examples of each. **[8]**

OR

Q2) a) Give PEAS descriptors for the following : **[10]**

i) Medical Diagnosis system

ii) Interactive English Tutor

b) Compare BFS & DFS search methods. **[8]**

Q3) a) Compare the different uniformed searching strategies with respect to different parameter. **[8]**

b) Explain A* algorithm to solve a problem with suitable example. **[8]**

OR

P.T.O.

Q4) a) Explain hill climbing algorithm with the help of plateau, ridge & local maxima. **[8]**

b) Explain min max search procedure with alpha & beta with suitable example. **[8]**

Q5) a) Explain following first order logic symbols with suitable example. **[8]**

$\forall, \exists, \Rightarrow, \wedge, \vee, \Leftrightarrow, \neg, =$

b) Explain the unification algorithm in detail. **[8]**

OR

Q6) a) Explain backward chaining algorithm with suitable examples. **[8]**

b) State the rules and steps for converting given well predicate logic statements to clausal from. **[8]**

SECTION - II

Q7) a) What are the different learning methods? Explain in them short. **[10]**

b) Which are the different ways to acess the performance of learning algorithm? **[8]**

OR

Q8) a) Explain the decision tree algorithm with suitable example. **[10]**

b) Explain in detail the architecture of artificial neural Network. **[8]**

Q9) a) What is difference between expert system and traditional system? Comment on the advantages and distadvantages of it. **[8]**

b) Design phases of an expert system to diagnose childhood disease. **[8]**

OR

Q10)a) Explain waltz algorithm with example and comment on its limitations. **[8]**

b) What is the preception? Give detailed structure for it. **[8]**

Q11)a) What is NLP? Explain all phases of NLP. **[8]**

b) Explain the steps of Natural language processing. **[8]**

OR

Q12)a) Explain the syntatic analysis with suitable example. **[8]**

b) Explain the semantic analysis with suitable example. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2900

[Total No. of Pages : 3

[5354] - 111
B.E. (E/TC)
ELECTRONICS PRODUCT DESIGN
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of non - programmable electronic calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of neat block diagram explain the different stages of electronic product design & development. Enlist the main objectives of each stage. **[10]**

b) Define reliability. Discuss the different schemes of reliability improvement. **[8]**

OR

Q2) a) Discuss in detail the importance of environmental tests performed on electronic product. For mobile phone which tests needs to be performed? **[10]**

b) What is ergonomics? Explain the general design considerations with respect to ergonomics. **[8]**

Q3) a) Explain the different factors while selecting op - amp as a signal conditioner. **[8]**

b) With the help of suitable example justify the type of A DC selection so as to satisfy the performance specifications. **[8]**

P.T.O.

OR

Q4) a) Discuss the considerations in selecting references (V_{ref}) for ADC. **[8]**

b) State the important specifications of any one DAC. Compare the different types of DAC's. **[8]**

Q5) a) Explain the different microcontroller architectures. **[8]**

b) With the help of suitable example discuss the important factors to be considered while selecting microcontroller. **[8]**

OR

Q6) a) Discuss the different types of touch screen technologies explain advantages and drawback of each. **[8]**

b) Write short notes on **[8]**

i) SPI

ii) I^2C

SECTION - II

Q7) a) Compare **[8]**

i) Simulation with prototyping.

ii) Low level language with high level language.

b) Explain the features & limitations of **[10]**

i) Debugger

ii) ICE

iii) IDE

OR

Q8) a) With the help of neat block diagram explain the water fall model of software design & development. **[8]**

b) Enlist the important features of : **[10]**

i) Flow chart

ii) Algorithm

iii) Pseudo code

Q9) a) Discuss in detail the PCB design practices for high speed digital circuits. **[8]**

b) What is signal integrity? Explain the different factors on which SI depends. **[8]**

OR

Q10) a) What is grounding? What are the different types of grounding? Explain different configurations of grounding with neat diagrams. **[8]**

b) Define EMI/EMC. Explain any one technique of noise reduction with suitable diagram. **[8]**

Q11) a) Explain the following terms - **[8]**

i) Bit & symbol error rate

ii) Spectral bandwidth

iii) SINAD

b) Explain in detail the requirements of multimedia & voice applications. **[8]**

OR

Q12) a) Explain the steps of design of following blocks of communication system. **[8]**

i) Equalizer

ii) Interleaver

b) Write short notes on **[8]**

i) Transmitter/Receiver Sensitivity.

ii) DPLL.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2901

[Total No. of Pages : 3

[5354] - 112
B.E. (E&T/C) (2008 Pattern)
VLSI DESIGN & TECHNOLOGY

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is enhancement mode? Give the expressions for drain current in saturation & non saturation regions. Explore transfer characteristics of MOSFET in detail. **[8]**

b) What are merits of MOSFET active load? Explain active load inverter in detail. **[8]**

OR

Q2) a) Draw and explain common drain amplifier. Give the expressions for voltage gain & output resistance. What are applications of this amplifier? **[8]**

b) Explore cascode amplifier in detail. What are merits? Give the expression for voltage gain. **[8]**

Q3) a) Draw voltage transfer curve of CMOS inverter. Explain various regions in detail. Which regions are good and bad for power dissipation? **[8]**

b) What is meant by velocity saturation? Explain in detail. **[8]**

P.T.O.

OR

Q4) a) Design CMOS logic for Y = ABC + D(E + F + G). Compare with any other method. **[8]**

b) What roles do power delay product & noise margin paly in digital design? Explain with necessary mathematical expressions. **[8]**

Q5) a) What are architectural modeling styles? How to select modeling style in design? Explain with suitable example. **[9]**

b) What is meant by synthesizable statement? Give any four examples along with the hardware inferred. **[9]**

OR

Q6) a) Write VHDL code for 16 bit serial in parallel out shift register. Write test bench for it. **[9]**

b) With the help of suitable schematic, explain techniques to avoid metastability. **[9]**

SECTION - II

Q7) a) Give typical specifications of CPLD. What is meant by speed grade? How will you make a decision to select CPLD in an application? **[8]**

b) With suitable schematic, explain basic computing block of CPLD. **[8]**

OR

Q8) What is meant by field programmable? What are types of FPGA? With the help of block diagram in detail explain architecture of FPGA. **[16]**

Q9) a) With suitable figures, explain stuck at faults in detail. **[8]**

b) What is need of DFT? Give example. **[8]**

OR

Q10) a) Why is full scan not possible in many applications? Explore partial scan in detail. **[8]**

b) What is JTAG? Explain pins involved, utility and various applications in brief. **[8]**

Q11) a) What are reasons of supply & ground bounce? How to minimize? **[9]**

b) Explore clock distribution techniques so as to minimize clock skew. **[9]**

OR

Q12) a) What is meant by validation? Explore with suitable example. **[9]**

b) List signal integrity issues. Explain any one in detail. **[9]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2902

[Total No. of Pages : 3

[5354] - 113
B.E. (Electronics & Telecommunication)
COMPUTER NETWORK
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are the responsibilities of transport layer in TCP/IP model? **[8]**

b) Explain Briefly : **[4]**

i) Host

ii) Subnet

iii) Broadcast network

iv) Point to point Network

c) Compare Coaxial Cable, Twisted pair cable and Fiber optic cables. **[6]**

OR

Q2) a) Draw and explain typical cable TV system. How cable video signal and internet data can be send over the same cable. **[8]**

b) Compare and contrast a circuit - switched and packet - Switched network. **[4]**

c) What is dial up modem technology? Explain in brief V.32 modem standards with data rate. **[6]**

P.T.O.

Q3) a) Explain Go Back - N ARQ and selective repeat ARQ protocols. **[8]**

b) What is the decision of DLL under the following situation? **[8]**

i) Normal operation

ii) Damaged or lost frame

iii) Acknowledgement is lost

iv) Acknowledgement is delayed. Explain with neat diagram.

OR

Q4) a) Draw the HDLC frame format and explain in detail the control field used in HDLC protocol for different frame types. **[8]**

b) Explain CSMA/CD. **[8]**

Q5) a) What is backbone network? What are its types? Explain in brief. **[8]**

b) Explain the different technologies used in high speed LAN. **[8]**

OR

Q6) a) List the functions of network layer. **[8]**

b) Draw the layer architecture and explain the functions of each layer in Bluetooth. **[8]**

SECTION - II

Q7) a) For a given classless IP address, how will you extract network address and host address? Explain with suitable example. **[8]**

b) Compare IPv4 and IPv6. **[8]**

OR

Q8) a) Write short notes on : **[10]**

i) ARP

ii) DHCP

b) Compare static and dynamic routing algorithm with suitable example. **[6]**

Q9) a) What are different transport service primitives? Explain QoS at transport layer. Define delay, congestion, throughput and Jitter. **[10]**

b) What is the purpose of subnetting? What is the function of DHCP? **[6]**

OR

Q10) a) What are the causes of congestion in network? Explain any one algorithm to avoid congestion. **[10]**

b) What are the main objectives of transport layer? Explain with neat diagram process to process delivery in transport layer. **[6]**

Q11) a) What are the main responsibilities of Application layer? Explain in brief. **[10]**

b) Explain : FTP and Telnet protocols. **[8]**

OR

Q12) Write short notes on : **[18]**

a) DNS

b) E - mail system.

c) WWW and internet.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2903

[Total No. of Pages : 3

[5354] - 114
B.E. (E & TC)
DIGITAL IMAGE PROCESSING
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***

2) ***Answers to the two sections should be written in separate books.***

3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain in depth MTF for human vision. **[8]**

b) Describe the following concepts. **[8]**

i) Mean

ii) Variance

iii) SNR

iv) PSNR

OR

Q2) a) Discuss components of image processing system with neat diagram. **[8]**

b) Explain spatial resolution & gray level resolution in case of digital image. **[8]**

Q3) a) What is colour model? Compare RGB & YIQ. **[8]**

b) Discuss various pseudo colouring techniques in image processing. **[8]**

OR

P.T.O.

Q4) a) Discuss image enhancement in frequency domain. **[8]**

b) Explian following concept used in image enhancement. **[8]**

i) Gray level slicing

ii) High boost filtering

Q5) a) What is KL transform? Discuss its properties and application. **[9]**

b) With reference to 2D transform explain **[9]**

i) Basis image

ii) Symmetry

iii) Separability

iv) Energy compaction

OR

Q6) a) A 2×2 block of image is given as $\begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$ Determine the DCT coefficients.

Write a comment on property of DCT which is proved in this example. **[9]**

b) Explain necessity of image transformation. Write a short note on **[9]**

i) Walsh transform

ii) Haar transform

SECTION - II

Q7) a) Explain Huffman coding with suitable example. Give its application. **[8]**

b) With suitable block diagram explain baseline JPEG compression system. **[8]**

OR

Q8) a) Which transforms are used for transform coding in image compression? Why? Explain. **[8]**

b) Explain intraframe and interframe redundancy with respect to MPEG. **[8]**

Q9) a) Explain the following transformations stating their applications. **[8]**

i) Erosion

ii) Opening

iii) Closing

iv) Thinning

b) What do you mean by Image Segmentation? Explain in detail Global & Local Thresholding. **[8]**

OR

Q10) a) What are the basic types of discontinuities found in an image? Explain the following edge extraction operators. **[8]**

i) Sobel

ii) Prewitt

iii) Laplacian

b) Write the algorithms for finding chain codes in 4 direction and 8 direction. **[8]**

Q11) a) Explain the Image degradation model in detail. **[8]**

b) Write a short note on **[10]**

i) Remote sensing using Image processing.

ii) Noise models

OR

Q12) a) Compare Image Enhancement with Image Restoration. **[8]**

b) How is Image processing used in security system? Explain with the help of Fingerprint Recognition. **[10]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2904

[Total No. of Pages : 3

[5354] - 115
B.E. (E & TC)
EMBEDDED SYSTEMS AND RTOS
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) How embedded systems are different from general purpose systems? Explain any three design metrics of embedded system. **[9]**

b) What are challenges of design and development of embedded system? **[9]**

OR

Q2) a) Explain with an example explain how design metrics compete with each other. **[9]**

b) Explain CAN protocol w.r.t. **[9]**

i) Need

ii) types

iii) frame formats

iv) CAN messages

Q3) a) Compare features of ARM 7, ARM9 & ARM 11 architecture. **[8]**

b) Explain any four selection criterions of processor for selection in embedded application. **[8]**

P.T.O.

OR

Q4) a) With neat diagram explain ADC interfacing with LPC 2148. Also write C program for the same. **[8]**

b) Compare following memory type w.r.t. usage in embedded application. **[8]**

i) ROM

ii) RAM

iii) flash

Q5) a) Compare embedded OS and general purpose of w.r.t. following **[8]**

i) Scheduling

ii) Protection

iii) Memory Management

iv) IPC

b) Compare various software architectures for embedded systems. **[8]**

OR

Q6) a) Explain features of ucos - II **[8]**

b) Explain following services of ucos - II. **[8]**

i) Task management

ii) Semaphore

SECTION - II

Q7) a) Explain typical embedded linux set up used for development of an application. **[8]**

b) Explain following utilities. **[8]**

i) Minicom

ii) Busybox

OR

Q8) a) Explain Linux file system in brief. **[8]**

b) Explain Kernel configuration utilities in brief. **[8]**

Q9) a) Compare & constrast waterfall and spiral model of software development life cycle. **[8]**

b) Explain QNX RTOS in brief. **[8]**

OR

Q10) a) Explain V model of software development life cycle. What are advantages and disadvantages for the same. **[8]**

b) What are features of **[8]**

i) Symtrian

ii) QNX

Q11) a) Explain smart card development w.r.t. **[9]**

i) Hardware

ii) Software

iii) Communication protocol.

b) Explain Hardware, software requirement of mobile phone. **[9]**

OR

Q12) a) With reference to Hardware and software explain digital camera. **[9]**

b) Explain typical cruise control system in automotive. **[9]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2905

[Total No. of Pages : 3

[5354] - 116
B.E. (E & TC)
INDUSTRIAL DRIVES & CONTROL
(2008 Pattern) (Semester - I) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicates full marks.***
5) ***All questions carry equal marks.***
6) ***Use of logarithmic tables slide rule, Mollier charts, and electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What are DC - to DC converters? Explain with diagram 4 - Quadrant reversible dc drive with inductive load. Draw suitable wave forms. **[8]**

b) Compare dual converter operating in circulating & non - circulating mode. **[8]**

OR

Q2) a) Derive the equation for average output voltage for the 3 phase full controlled converter operating from 415V, 50 Hz with inductive load. **[8]**

b) Explain with circuit diagram and waveforms working of 2 Quadrant step - down chopper. Derive the equation for average output voltage. **[8]**

Q3) a) What are inverters? Explain with circuit diagram & waveforms working of 3 ϕ VSI operating in 180° mode conduction with star connected resistive load. State equation for any one line voltage. **[8]**

b) Compare Linear, switched mode & resonant converter. **[8]**

OR

P.T.O.

Q4) a) Explain Harmonic reduction technique used in Inverters. Comment on power factor. **[8]**

b) What is single resonant & multi resonant converter? State its advantages & disadvantages. **[8]**

Q5) a) What are DC drives? Explain with circuit diagram & wave forms, working of 1 ϕ, separately excited DC motor working with highly inductive load. **[10]**

b) What are DC motor performance characteristics? Explain. **[8]**

OR

Q6) Write short notes on any three **[18]**

a) 3 ϕ Dual converter

b) Speed control of 3 ϕ series motor.

c) 3 ϕ CSI

d) Buck converters.

e) Multi - level inverters.

SECTION - II

Q7) a) What are induction motors? Explain with circuit diagram, speed control technique of induction motor by using v/f control technique. **[8]**

b) Explain how you will improve the slip power. State its sub synchronous & super synchronous modes. **[8]**

OR

Q8) a) Explain direct vector control and in - direct vector control technique for induction motor drive. **[8]**

b) Derive the expression for Maximum torque and maximum slip for induction motor assuming Rs = 0 also explain braking method for induction motor. **[8]**

Q9) a) What is stepper Motor? Mention various types of stepper motors & explain any one type. State its applications. **[8]**

b) What is reluctance motor? Compare with salient pole Permanent magnet motors. **[8]**

OR

Q10) a) What are brushless motors? Explain with block diagram working of 3 ϕ brushless DC motor. **[8]**

b) What is Micro - stepping? Explain with circuit diagram working of microprocessor based stepper motor control state its advantages. **[8]**

Q11) a) Explain the operation of fuzzy logic based IM for wind generation system. **[10]**

b) What is power quality? Mention various types of power line disturbances & suggest preventive & nullifying measures for these disturbances. **[8]**

OR

Q12) Write short notes on any three **[18]**

a) Traction Drives.

b) LCI (Line commutated Inverter)

c) Flux Vector control of IM.

d) Static Krammer drive.

e) Protection Circuits for motors.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2906

[Total No. of Pages : 3

[5354] - 117
B.E. (E & TC)
MICROWAVE COMMUNICATION & RADAR
(Elective - 1) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt from Section - I : Q. 1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and from Section - II : Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***

2) ***Draw neat diagrams.***

3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What are microwave? Explain advantages and applications of microwave. **[9]**

b) An air - filled rectangular waveguide of inside dimensions 7 × 3.5 cm operates in the dominant TE_{10} mode. Find the following : **[9]**

i) Cut off frequency

ii) Phase velocity

iii) Guide wavelength

OR

Q2) a) Discuss the power losses & power transmitted in rectangular waveguide. **[9]**

b) Differentiate TE mode & TM mode. **[9]**

Q3) a) Describe the operation of two - hole directional coupler. **[8]**

b) Describe the operation of E - plane & H - plane tees. **[8]**

OR

P.T.O.

Q4) a) What is the significance of scattering matrix? Write the properties of s - matrix. **[8]**

b) Explain with neat diagram microwave circulators & Isolators. **[8]**

Q5) a) Draw & explain the working of Reflex Klystron. **[8]**

b) Explain the operating modes of magnetron. **[8]**

OR

Q6) Write a short note on **[16]**

a) Bunching process and velocity modulation.

b) Slow - wave structure & TWT.

SECTION - II

Q7) a) Explain the construction & operation of varactor diode. **[9]**

b) Explain the construction & operation of Gunn diode. **[9]**

OR

Q8) Write short note on : **[18]**

a) Microwave transistors.

b) Parametric amplifiers.

c) IMPATT diode

Q9) a) Explain attenuation measurement technique in detail. **[8]**

b) Explain with neat block diagram the network analyzer. **[8]**

OR

Q10) Explain the following parameters. **[16]**

a) SWR, VSWR & ISWR.

b) Reflection & Transmission coefficient.

c) Power & VSWR meter.

Q11) a) Explain the principle & working of pulse radar. **[8]**

b) Explain the factors that affect the maximum range of radar. **[8]**

OR

Q12) Write short on **[16]**

a) Display devices

b) Radar becons

c) Antennas

d) Phased array radars

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2907

[Total No. of Pages : 3

[5354] - 119
B.E. (E & TC)
JOINT TIME FREQUENCY ANALYSIS
(Elective - II) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State & Prove the Parseval's Theorem. **[8]**

b) Discuss the Heisen berg's principle. **[4]**

c) What are Hilbert spaces? What are Banach spaces? **[4]**

OR

Q2) a) Write the mathematical expression for STFT. **[2]**

b) Discuss Hilbert Transform & its applications. **[6]**

c) Calculate the time variance & frequency variance for the Haar scaling function. **[8]**

Q3) a) Compare STFT and Wavelet Transform on the basis of their tiling diagram. **[6]**

b) What are analytic wavelets. **[2]**

c) Explain the effect of dilation & Translation of a function $\psi(t)$ in frequency domain. **[8]**

P.T.O.

OR

Q4) a) Draw Haar 2 - band filter bank structure. **[4]**

b) Discuss the inadequecies of Haar Two band filter bank structure. **[4]**

c) Consider the two channel filter bank whose two filters are given below :

$$H_0(z) = 1 + z^{-1} + z^{-2}$$

$$\& \quad H_1(z) = 1 - z^{-1} + z^{-2} - z^{-3}$$

Find out filters $G_0(z)$ & $G_1(z)$ so that alias cancellation occurs. **[8]**

Q5) a) Discuss the MRA axioms. **[8]**

b) Explain the concept of linear subspaces with neat diagram. **[2]**

c) Obtain and sketch the magnitude & frequency response of

i) Lowpass Synthesis filter. **[4]**

ii) Highpass Analysis filter. **[4]**

OR

Q6) a) Explain the reconstruction of $x(t)$ from CWT. (Inverse CWT) **[8]**

b) $f(t) = \sum_k a_k \phi_1(t-k)$

Given : $a_k = \{1, 2, 0, 1, 2\}$

Find $f(t)$ for ϕ_0 & ϕ_1. Plot $f(t)$.

i) $\phi_0(t) = 1$ for $t = 0$ to 1 **[5]**

ii) $\phi_1(t) = 1 - |t|$ for $t = 0$ to 2. **[5]**

SECTION - II

Q7) a) Discuss the properties of wavelets. **[4]**

b) Using perfect reconstruction condition of conjugate quadrature filter banks, determine analysis LPF coefficients of Daub - 4 **[6]**

c) Using the alias cancellation condition find out the analysis high pass & synthesis low pass coefficients of Daub - 4 **[8]**

OR

Q8) Write short note on : **[18]**

a) Connection between Haar & Daub 4.

b) Meyer Wavelets

c) Battle - Lemarie Wavelets

Q9) a) Discuss the concept of Wavelet packet tree with neat labelled diagram. **[8]**

b) Using modified PR condition of conjugate quadrature filter banks, determine the analysis filter coefficients for JPEG 2000 5/3 bi - orthogonal tap. **[8]**

OR

Q10) a) Given $x(n) = \{4, 7, 9, 4\} \in V_2$ Develop Wavelet lifting scheme using MRA frame work, decompose the signal to 0^{th} subspace.
Show perfect Reconstruction
Clearly show 'split' 'update' & 'predict' stages & their outputs. **[12]**

b) How does the computations take place 'in - place'? Explain. **[4]**

Q11) Write a short note on :

a) Scalograms. **[8]**

b) Spectrograms. **[8]**

OR

Q12) Given $x(n) = \{24, 2, 30, 4, 28, 2, 18, 0\} \in V_3$

a) Show smoothening effect. **[8]**

b) Reconstruct after suppressing coefficients in w_j subspace. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2831

[Total No. of Pages : 3

[5354] - 12
B.E. (Civil)
EARTHQUAKE ENGINEERING
(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***From Section - I answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and from Section - II answer Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures in bold to the right, indicate full marks.***
4) ***IS 456, IS 1893, IS 13920 are allowed in the examination.***
5) ***Neat diagrams should be drawn wherever necessary.***
6) ***If necessary, assume suitable data and indicate clearly.***
7) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) What are the types of earthquake? Explain with neat sketches the Plate Tectonic Theory? **[4]**

b) Classify and describe with suitable sketches, different types of waves generated by an earthquake. **[6]**

c) Describe the difference between magnitude and intensity of an earthquake. **[6]**

OR

Q2) a) Define Isoseismal and describe their uses? **[8]**

b) Explain different causes of earthquake. **[8]**

Q3) a) A simply supported beam 3m long supports mass of 100kg at the center. Find the natural period and natural frequency. $E = 2.1 \times 10^6$ kg/cm^2 & EI = 10,000 kN.m^2. **[8]**

b) Explain with examples, over damped system, critically Damped system and under damped system giving example of each for free but damped SDOF. **[8]**

P.T.O.

OR

Q4) For the two degree freedom system shown in Figure 4.1, obtain natural frequencies and amplitude ratios. Assume K = 20kN/m. **[16]**

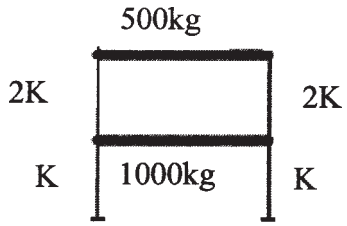


Figure 4.1

Q5) Determine the design eccentricity in X-direction for a three storey building as shown in Figure 5.1 The total seismic weight/floor = 500 kN. The column size = 400 mm x 500 mm. Assume grade of concrete = M25. **[18]**

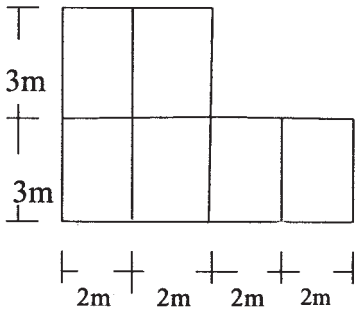


Figure5.1

OR

Q6) Calculate the distribution of base shear at each floor level as per seismic coefficient method for the OMRF without brick infill building shown in Fig.6.1. The building is located in Zone III. The frames are spaced at 4m c/c. Assume soil of Type II. Assume Three storeyed building with D.L. = 5kN/m^2, L.L. = 4kN/m^2 on each floor and 1.5 kN/m^2 on roof. Storey height = 3m. **[18]**

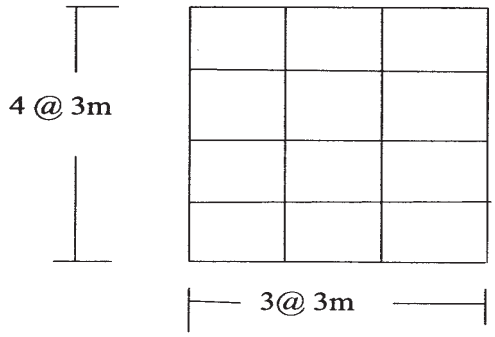


Figure 6.1

SECTION - II

Q7) a) What is the necessity of ductile detailing? Explain with neat sketches the detailing for flexural member as per IS 13920(1993). **[9]**

b) What is liquefaction of soil? Explain the effects and various methods to reduce the effects of liquefaction. **[9]**

OR

Q8) a) Define the shear wall and its classification. Describe the structural behavior of shear wall. **[9]**

b) What is Seismic Isolation? Discuss in details with the sketches, the concept of Isolators and Dampers? **[9]**

Q9) What is strengthening and retrofitting? Explain in brief the techniques for retrofitting of traditionally build constructions? **[16]**

OR

Q10) Explain the various techniques of retrofitting and rehabilitation of structures. **[16]**

Q11) A (230 X 500) mm column is reinforced with 8-16#. It is supported on an isolated footing. The load coming on the footing is 2500 kN and a moment of 25 kNm. The SBC of the soil is 164 kN/m^2. Use M20 grade of concrete and steel of grade Fe 415 and design the footing. **[16]**

OR

Q12) Write notes on the following with neat sketches (Any Three): **[16]**

a) Moment Resisting Frames.

b) Concentrically Braced Frames.

c) Eccentrically Braced Frames.

d) Ductile Detailing of Slabs.

e) Tuned Mass Dampers.

Total No. of Questions : 12]

SEAT No. :

P2908

[Total No. of Pages : 3

[5354] - 120
B.E. (Electronics & Telecommunication)
MEMS & SYSTEM ON CHIP
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt 3 questions from each section.***

2) ***Attempt from Section - I : Q. 1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and from Section - II : Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***

3) ***Draw neat diagrams.***

4) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain basic working principal of accelerometer? **[8]**

b) What do you mean by scaling in electromagnetic force? Justify : electromagnetic force is $f \alpha\ l^4$ for cross section area of conductor. **[8]**

OR

Q2) a) Explain mechanical properties of materials used in MEMS sensor design. **[8]**

b) Explain in detail materials used in microsystems. **[8]**

Q3) a) Explain principal planes of a silicon crystal. What characteristics do silicon principal planes offers? **[8]**

b) Explain working principal of silicon piezoresistors? **[8]**

OR

Q4) a) Explain working principal of chemical sensors. **[8]**

b) Explain physical properties of silicon. Which silicon compounds are used in MEMS manufacturing. **[8]**

P.T.O.

Q5) a) Explain working principal of biosensor for measurement of blood glucose concentration in a patient. **[9]**

b) Explain working principal of thermal sensor. Where these are employed? **[9]**

OR

Q6) a) Which different properties of molecule - based biosensors are used in MEMS based sensor design. **[9]**

b) Explain working principal of RF transducer. Where these transducers are used? **[9]**

SECTION - II

Q7) a) Explain SoC architecture in detail. What are advantages of SoC design over VLSI design? **[8]**

b) Explain impacts into chip design of integrating highly complex electronic systems as systems on a chip. **[8]**

OR

Q8) a) What are the important parameters which define wafer level bonding? Also give its significance. **[8]**

b) Explain different low power microsystems technology and applications. **[8]**

Q9) a) Explain abstraction levels in contact to synthesis tool. **[8]**

b) What reliability issues are crop up in packaging? Which factors leads failures in packaging? **[8]**

OR

Q10) a) Explain working of PVD? Which PVD process is used in MEMS and SoC fabrication? **[8]**

b) Compare and contrast data flow versus control flow. **[8]**

Q11) a) What problems cope up in testing of Microsystems? How these problems are patched up and rectified? **[9]**

b) What is LEGAL? Explain LEGAL algorithm steps. What kind of improvement inculcated in LEGAL in context to earlier routing algorithms? **[9]**

OR

Q12) a) What are the issues in testing of core based systems on chip. **[9]**

b) Which features are inculcated in co - design tool? Explain design steps for co - design. **[9]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2909

[Total No. of Pages : 3

[5354] - 121
B.E. (E & TC)
MOBILE COMMUNICATION
(Elective - II) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Discuss the evolution from 1g to 2g, 2.5g in case of cellular network based on TDMA. Describe the strategies adopted by different network operators while migrating towards third generation system. **[8]**

b) Give the comparison of 2g & 3g cellular networks. **[8]**

OR

Q2) a) Discuss in detail how to improve the coverage in cellular systems. **[8]**

b) What is the conapt of frequency reuse? Explain in detail with example. **[8]**

Q3) a) Explain in detail free space propagation model. Find the Fraunhofer distance for an antenna with maximum dimension of 1m and operating frequency of 900 MHg. If antennas have unity gain, calculate the path loss. **[8]**

b) Prove that in the two - ray ground reflected model. $\Delta = d'' - d' \approx 2hthr / d$ Show when this holds as a good approximation. **[8]**

OR

P.T.O.

Q4) a) For the knife - edge geometry, show that **[8]**

$$\phi = \frac{2\pi\Delta}{\lambda} = \frac{2\pi}{\lambda}\left[\frac{h^2}{2}\left(\frac{d_1 + d_2}{d_1 d_2}\right)\right]$$

b) What are the different factors influencing small scale fading. In the digital cellular system if fc = 900 MHz and the mobile velocity is 70 Km/hr. Calculate the received carrier frequency if the mobile. **[8]**

i) Directly toward the transmitter (positive doppler shift)

ii) Directly away from the transmitter (Negative doppler shift)

Q5) a) Draw the block diagram of a GMSK Transmitter & Receiver. Also explain the function of each block. **[9]**

b) What is the concept of MPSK? Explain in detail power spectra of MPSK. **[9]**

OR

Q6) a) Draw the Block diagram of a DS - SS Transmitter & Receiver with binary phase modulation. Give the comparison of DS - SS & FHSS. **[9]**

b) With the help of block diagram explain the function of each block of an adaptive equalizer at the receiver. **[9]**

SECTION - II

Q7) a) Explain in detail CDMA. What is the near - far problem in CDMA? **[8]**

b) Give the difference between OFDM & FHMA. **[8]**

OR

Q8) a) Explain in detail vocoders & coders. What are the different selection criteria of speech coders for mobile communication. **[8]**

b) Explain the packet radio protocol. Discuss what is the SDMA. **[8]**

Q9) a) Draw the structure of GSM system architecture. focus on function of each block. **[8]**

b) Discuss in detail the GSM frame structure. **[8]**

OR

Q10) a) Explain in GSM system. How to establish connection & handover. **[8]**

b) Explain logical & physical channel in GSM system. **[8]**

Q11) a) Explain the logical & physical channels for IS - 95CDMA system. **[9]**

b) Give in detail the randomization of power control bit position in a IS - 95 forward traffic channel. **[9]**

OR

Q12) a) Draw the block diagram for reverse IS - 95 channel modulation process for a single user. Explain function of each bolck. **[9]**

b) Explain in detail CDMA 2000 system. **[9]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2910

[Total No. of Pages : 3

[5354]-122

B.E. (Semester - II)

ELECTRONICS & TELECOMMUNICATION

Telecommunication & Switching System

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section-I and 3 questions from Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***In Section-I: Answer Q.1 OR Q. 2, Q.3 OR Q. 4, Q.5 OR Q.6 and Section-II. Answer Q.7 OR Q.8, Q.9 OR Q.10, Q.11 OR Q.12.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figure to the right indicate full marks.***
6) ***Use of electronic pocket calculator is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain different functions of manual switching. **[8]**

b) Explain in detail circuit switching and packet switching. **[8]**

OR

Q2) a) Explain in detail the space division switching systems. **[8]**

b) Calculate the availability and unavailability of single and dual processor system with MTBF=3600 HRS. and MTTR=4 HRS. in 25 years. **[8]**

Q3) a) Define and explain: **[10]**

i) Unit of traffic

ii) Grade of Service

iii) Call completion rate.

iv) Blocking Probability.

v) Congestion.

P.T.O.

b) A group of 20 trunks provides a grade of service of 0.01 when offered 12 E of traffic. **[6]**

i) How much is the grade of service improved if one extra trunk is added to the group?

ii) How much does the grade of service deteriorate if one trunk is out of service?

OR

Q4) a) Explain the mathematical model for lost-call systems? **[8]**

b) During a busy hour 900 calls were offered to a group of trunks and 03 calls were lost. The average call duration has 3 minutes. Find, **[8]**

i) Traffic offered.

ii) Traffic carried.

iii) Traffic lost.

iv) GOS.

Q5) a) Define Grading? With neat sketch, Explain in detail various grading system. **[10]**

b) Design a grading for connecting 20 trunks to switches having 10 outlets. **[8]**

OR

Q6) a) Explain the following terms: **[10]**

i) Call Packing

ii) Strict sense non blocking networks

b) Explain the CCITT no. 7signalling system? **[8]**

SECTION - II

Q7) a) State different types of jitter? Explain in detail timing jitter. **[8]**

b) What is mean by pulse stuffing? How the Pulse stuffing help to synchronize the network? **[8]**

OR

Q8) a) Explain the routing control in network Management. **[8]**

b) How the master slave synchronization work in the network. **[8]**

Q9) a) Explain the data transmission in PSTN with the help of a diagram. **[8]**

b) Explain the LAN and MAN? State the advantages of LAN and MAN. **[8]**

OR

Q10)a) Draw and explain the protocol architecture of ISDN. **[8]**

b) Explain in detail satellite based data networks. **[8]**

Q11)a) What is interference? Explain the different types of interference in cellular system? **[10]**

b) Explain call procedure in completing a call from mobile (cellular) to mobile (cellular). **[8]**

OR

Q12)a) Draw and explain in detail the GPRS system architecture. Explain the different types of services provided by GPRS. **[10]**

b) Explain the practical handoff consideration in cellular system. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P4898

[Total No. of Pages : 4

[5354] - 123
B.E. (E/TC)
OPTICAL FIBER COMMUNICATION
(2008 Pattern)

Time :3 hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6from Section-I and Q.7or Q.8, Q.9 or Q.10, Q.11 or Q. 12 from Section-II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Figures to the right indicate full marks.***
4) ***Your answer will be valued as a whole.***
5) ***Neat diagrams must be drawn whenever necessary.***
6) ***Assume suitable data, if necessary***

SECTION-I

Q1) a) State and explain the advantages of optical fiber communication system. **[6]**

b) A step index fiber with a core refractive index of 1.5 has a refractive index difference of 1.3% and core diameter of 40 μm. Estimate the number of guided modes propagating in the fiber when the transmitted light has a wavelength of 1.55 μm. **[6]**

c) Define numerical aperture of an optical fiber and derive an expression for the same. **[6]**

OR

Q2) a) Compare and contrast **[6]**

i) Multimode and single mode fiber.

ii) Step index and graded index fiber.

b) Explain the terms: Mode field diameter, spot size and cut off wavelength for a single mode fiber. **[6]**

c) State advantages and disadvantages of vapour phase decomposition in the preparation of glass for optical fiber. **[6]**

P.T.O.

Q3) a) Explain macro bending and micro bending effects in optical fiber. **[8]**

b) What is dispersion? Explain the various dispersion mechanisms that are observed in multimode and single mode optical fibers. **[8]**

OR

Q4) a) State and explain the requirements of a good optical source for optical fiber communication? **[8]**

b) Compare LED and ILD as optical source. Why LED is preferred as light source for analog link over ILD? Support your answer with a suitable diagram. **`[8]**

Q5) a) Sketch and explain **[8]**

i) Insertion loss characteristics for jointed fibers with various types of misalignments.

ii) Various mismatch losses at the fiber joints.

b) Explain fiber optic splices. What are different types of splices? Explain any one type of splice with diagram. How splice differs from a connector? **[8]**

OR

Q6) a) A DH InGaAsP LED emitting at a peak wavelength of 1310 nm has radiative and non- radiative recombination times of 30 and 90 ns respectively. The drive current is 40mA. Calculate internal quantum efficiency and internal power level. **[8]**

b) Explain the concept of intensity modulation of LEDs and Lasers diodes using I-P characteristics. **[8]**

SECTION-II

Q7) a) Explain the principle of working and characteristics of photo transistor.**[6]**

b) With reference to optical detector explain the following terms: **[6]**

i) Dark Current Noise

ii) Quantum Noise

iii) Thermal Noise

c) Explain the terms quantum efficiency and responsivity of a photo detector. How these terms are related to each other? **[6]**

OR

Q8) a) Compare and contrast p-i-n and avalanche photo diode. **[6]**

b) For the wavelength range l300nm <λ< l600nm, the quantum efficiency for InGaAs is around 90% **[6]**

i) Calculate responsivity at l300nm

ii) Calculate the cut off wavelength of this detector considering energy gap of InGaAs as Eg=0.73 eV

iii) State the reason for the rapid decrease in responsivity for smaller wavelengths

c) Explain the following factors with reference to limiting the speed of response of a photo diode **[6]**

i) Drift time of carriers.

ii) Diffusion time.

iii) Time constant.

Q9) a) Describe the system considerations in establishing point to point optical fiber link. **[8]**

b) A 1550 nm single mode digital fiber optical link needs to operate at 622Mb/s over 90 km without amplifiers. A single mode InGaAsP laser launches an average optical power of l3dBm into the fiber. **[8]**

The fiber has a loss of 0.35dB/km and there is a splice with a loss of 0.1 dB every kilometer. The coupling loss at the receiver is 0.5 dB and the receiver uses an InGaAs APD with sensitivity of-39dBm. Excess noise penalties are predicted to be 1.5 dB. Set up an optical power budget for this link and find the system margin.

OR

Q10)a) Describe digital link budget. Explain in detail system rise time budget analysis for digital link design. **[8]**

b) An optical fiber system is to be designed to operate over an 8km length without repeaters. **[8]**

The rise times of the chosen components are:

Source (LED):	8ns
Fiber: (Intermodal):	5ns km^{-1}
(Pulse Broadening) intramodal:	1 ns km^{-1}
Detector (p-i-n photodiode):	6 ns

From the system rise time considerations, estimate the maximum bit rate that may be achieved on the link when using an NRZ and RZ format.

Q11)a) Explain various applications of optical amplifiers. Support your answer with suitable diagram. **[8]**

b) Explain in detail the architecture and principle of working of EDFA. What are noises observed in EDFA? **[8]**

OR

Q12)a) Draw block schematic of WDM and explain working. Specify range of wavelengths commonly used for WDM. **[8]**

b) Draw block schematic of OTDR and explain its working. What are important performance parameters of an OTDR? **[8]**

Total No. of Questions : 12]

SEAT No. : ____

P2911

[Total No. of Pages : 3

[5354]-124
B.E. (E&TC)
SOFT COMPUTING
(2008 Pattern) (Semester - II) (Elective - III)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers any one Questions out of Q1 & Q2 and Q3 & Q4.***
2) ***Answer any one Questions out of Q5 & Q6 and Q7 & Q8.***
3) ***Answer any one Questions out of Q9 & Q10 and Q11 & Q12.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of calculator is allowed.***
7) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the mathematical model of an artificial with the importance of threshold function. **[9]**

b) Compare soft computing with hard computing clearly stating the advantages of soft computing. **[9]**

OR

Q2) a) Given Fuzzy sets are A and B. Find Complement, Union, Intersection, Difference and apply the DeMorgan's laws: **[9]**

$$A = \left\{ \frac{0.1}{2}, \frac{0.5}{3}, \frac{0.2}{4}, \frac{0.4}{5}, \frac{0.9}{6}, \frac{0.1}{7}, \frac{0.7}{8} \right\}$$

$$B = \left\{ \frac{0.1}{2}, \frac{0.6}{3}, \frac{0.5}{4}, \frac{0.3}{5}, \frac{0.2}{6}, \frac{0.7}{7}, \frac{0.1}{8} \right\}$$

b) Write short notes on (Any Two) : **[9]**

i) Evolutionary computation

ii) Hybrid fuzzy logic systems

iii) Properties on fuzzy sets.

P.T.O.

Q3) a) What is T-norm and T-conform? Explain with example. **[8]**

b) Describe in detail the process of de-fuzzification. What are the various methods of de-fuzzification? Explain any two in detail. **[8]**

OR

Q4) a) Explain the Generalized Bell and Trapeziodal membership functions with neat diagrams. **[8]**

b) Define the following terms with respect to Fuzzy Inference System. **[8]**

i) ε-completeness

ii) Fuzzy Associative Memory

Q5) a) Explain with a neat block diagram the architecture of FLC. **[8]**

b) What are the advantages of FLC over conventional PID controller? **[8]**

OR

Q6) a) State the importance and flexibility offered by composite linguistic variables with an example. **[8]**

b) Explain the Mamdani inference model with an example. **[8]**

SECTION - II

Q7) a) Implement the functionality of AND-NOT gate using McCulloch-Pitt neuron models. **[8]**

b) Explain the Hebb rule for learning and state the limitation of Hebb Rule and modification for overcoming the same. **[8]**

OR

Q8) a) What is Perceptron? Explain the limitations of perceptron with an example. **[8]**

b) Compare threshold and bias with respect to an Artificial Neuron. Why is bias preferred over threshold? **[8]**

Q9) State the application of artificial neural networks for classification with a simple example. **[18]**

OR

Q10)a) Explain the backpropagation algorithm with a neat signal flow diagram. **[9]**

b) Explain Self Organizing Feature Map with an appropriate example. **[9]**

Q11)Write notes on: (any two) **[16]**

a) Two pass learning in ANFIS

b) ANFIS for function approximation

c) Use of ANN in signal processing

OR

Q12)a) Draw and explain architecture of ANFIS. **[8]**

b) What are the limitations of ANFIS? In what situations is ANFIS preferred? **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2912

[Total No. of Pages : 3

[5354]-125
B.E. (E&TC)
SPEECH PROCESSING
(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or 0.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answers for section I and Section II should be written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat block diagrams wherever necessary.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain LTV model for speech production ? What are the limitations of LTI model for speech production? **[8]**

b) Explain pitch period? Discuss different methods for finding the pitch period and compare them? **[8]**

OR

Q2) a) Explain the terms : **[8]**

i) Vowels ii) Diphthongs.
iii) Semivowels iv) nasals
v) fricatives vi) Stops
vii) Affricates viii) Consonants

b) Explain the technique to separate voiced and unvoiced region of speech using energy and ZCR. **[8]**

Q3) a) Explain Levinson -Durbin recursive algorithm for calculation of predictor coefficients **[8]**

b) Explain the basic principal of Linear predictive analysis? Explain autocorrelation method to calculate LPC coefficients. **[8]**

P.T.O.

OR

Q4) a) Explain the method to determine pitch using LPC? **[8]**

b) Give the solution for LPC covariance method using Cholesky Decomposition. **[8]**

Q5) a) What is MFCC ? Explain the method to calculate MFCC using block diagram? **[8]**

b) With the help of block diagram explain homomorphic speech processing. **[10]**

OR

Q6) a) Draw the block diagram for the evaluation of formants using cepstrum and explain how to locate formant frequencies? **[10]**

b) What is complex cepstrum ? Explain the procedure to calculate cepstrum? Explain in brief the properties of complex cepstrum. **[8]**

SECTION - II

Q7) a) What is speech enhancement? Explain spectral subtraction method of speech enhancement in detail. **[8]**

b) Compare different speech enhancement techniques. **[8]**

OR

Q8) a) What is wiener filter? How can it be used for speech enhancement, Explain. **[8]**

b) Explain the method of speech enhancement by re-synthesis and compare with other methods. **[8]**

Q9) a) What are the three basic problems associated with HMMs. Give their solution. **[8]**

b) Explain hidden markov model for speech recognition with an example. **[8]**

OR

Q10)a) Explain Dynamic time warping with respect to speech recognition. **[8]**

b) What are different Mathematical and Perceptual considerations for patter comparison techniques w.r.t. speech recognition? Explain. **[8]**

Q11)a) What are the challenges for speaker recognition system ? explain. **[9]**

b) Write short note on speech processing hardware and software architectures. **[9]**

OR

Q12)a) Explain with block diagram Text-to-Speech conversion system? Explain function of each block in detail. **[9]**

b) Explain in brief the methods of handling speech recognition errors. **[9]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2913

[Total No. of Pages : 2

[5354]-126

B.E. (Electronics & Telecommunication Engineering)

TELEVISION & VIDEO ENGINEERING

(2008 Pattern) (Semester - II) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Write a note on composite video signal. **[4]**
b) Write a note on Signal transmission and channel bandwidth. **[6]**
c) Draw and explain the block diagram of color television system. **[6]**

OR

Q2) a) Draw and explain chromaticity diagram. **[4]**
b) Draw and explain the block diagram of television transmitter. **[6]**
c) What is interlaced scanning and why it is used in television system? **[6]**

Q3) a) Compare NTSC, SECAM and PAL television systems. **[6]**
b) Draw and explain low level transmission in television system. **[6]**
c) Explain working of NTSC Encoder with suitable diagram. **[6]**

OR

Q4) a) State the importance of pattern generator. **[6]**
b) Explain working of PAL Encoder with suitable diagram. **[6]**
c) What do understand by resolution or kell factor? How does it affect the vertical resolution of a TV picture? **[6]**

P.T.O.

Q5) a) Give the principle of digital television system. **[6]**
b) Discuss Digital TV recording techniques. **[6]**
c) Write a short note on MAC signal. **[4]**

OR

Q6) a) Give the advantages of Digital TV over Analog TV. **[6]**
b) Explain the principles of Video compression. **[4]**
c) Write a short note on MPEG. **[6]**

SECTION - II

Q7) a) Write a note on: **[12]**
i) Video on demand (VoD)
ii) Conditional access system(CAS)
iii) Direct to home (DTH)
b) Explain 3D stereoscopic techniques. **[6]**

OR

Q8) a) Case study- Live TV coverage plan for a cricket match. **[10]**
b) Draw and explain set top box with recording facility. **[8]**

Q9) a) What are the features of IPTV, explain the architecture of IPTV. **[8]**
b) Describe the concept of video transmission in 3G mobile. **[8]**

OR

Q10)a) Define in detail high definition video projector. **[8]**
b) Discuss in detail video door phones. **[8]**

Q11)a) Compare performance parameters of: **[8]**
VCD, DVD, HD-DVD, BD-DVD
b) Explain acoustical design of an auditorium. **[8]**

OR

Q12)a) Write a note on: **[8]**
i) Camcoders
ii) Handy cams
b) Write a note on display devices: **[8]**
i) LED
ii) Plasma

Total No. of Questions : 12]

SEAT No. : ____

P2914

[Total No. of Pages : 2

[5354]-127
B.E. (Electronics & Telecommunication)
TEST AND MEASUREMENT SYSTEMS
(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Explain human and computer interface used in measuring instruments. **[8]**

b) Explain calibration, calibration standards and traceability. **[10]**

OR

Q2) a) Explain "Network connection model "in details. **[8]**

b) Explain the RF vector voltmeter in details? What is the need of RF vector voltmeter. **[10]**

Q3) a) List out the specification of DVM in details. **[8]**

b) Explain in details typical instrument block diagram. **[8]**

OR

Q4) a) Explain the working of successive approximation digital voltmeter. **[8]**

b) Explain with neat diagram heterodyne wave analyzer. **[8]**

Q5) a) A set of voltage measurement by five observers is recorded as 340m volts, 400m volts and 380m volts. Calculate. **[8]**

i) Arithmetic mean, ii) Average deviation
iii) Standard deviation and iv) Variance.

b) Explain the display methods used in analysis using logic analyzer. **[8]**

OR

P.T.O.

Q6) a) State the different capabilities of MSO. **[8]**

b) Draw and explain the block diagram of an Arbitrary Waveform Generator. **[8]**

SECTION - II

Q7) a) Explain the requirement of the ATS. **[8]**

b) List and explain the features of LABVIEW. **[8]**

OR

Q8) a) Discuss the FET analyzer with neat block diagram. **[8]**

b) Explain the detail structure of IEEE 488 instrumentation bus used to interface spectrum analyzer with computer. **[8]**

Q9) a) What is the difference between dual beam and dual trace CRO. **[10]**

b) Explain the block diagram of virtual instrument with its components. **[8]**

OR

Q10)a) Discuss the following terms, **[10]**

i) Error,

ii) Variance

iii) Sensitivity

b) Explain IEEE standards of the measurements. **[8]**

Q11)a) Compare different solid state microwave signal sources. **[8]**

b) The rise time measure on 100 MHz DSO is 19 nano seconds, find actual rise time of the signal. **[8]**

OR

Q12)a) Compare dual trace and dual beam CRO. **[8]**

b) What is meant by vertical resolution. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2915

[Total No. of Pages : 3

[5354]-128

B.E. (E&TC)

ARTIFICIAL INTELLIGENCE

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Explain architectures of agents. Give two examples where these agents are used. **[8]**

b) Compare depth first and breadth first search methods. **[8]**

OR

Q2) a) State the different properties of task environment. Give suitable example for each. **[8]**

b) Explain 'simple reflex based agent' with the help of schematic diagram. **[8]**

Q3) a) Draw the search tree for tic-tac-toe. **[8]**

b) Compare the different uninformed searching strategies with respect to different parameters. **[8]**

OR

Q4) a) Explain different search strategies w.r.t. time complexity, space complexity, optimality and completeness. **[8]**

b) Explain constraint satisfaction algorithm with its pseudo code. **[8]**

P.T.O.

Q5) a) What is knowledge representation using propositional logic? Compare propositional and predicate logic. **[10]**

b) Explain the concept of forward chaining and backward chaining in the knowledge representation. **[8]**

OR

Q6) a) Consider the following axioms **[10]**

If triangle is equilateral then it is isosceles.

If triangle is isosceles then two sides AB & AC are equal

If AB & AC are equal then angle B and C are equal

ABC is equilateral triangle

i) Represent these facts in predicate logic

ii) Use resolution to prove "Angle B is equal to angle C"

b) State the rules and steps for converting a given well predicate logic statements to clausal form. **[8]**

SECTION - II

Q7) a) What are different learning methods? Explain them in short. **[10]**

b) Explain ADA-BOOST algorithm with pseudo code. **[8]**

OR

Q8) a) Explain in detail, Instance based learning. **[10]**

b) Explain in detail the architecture of Artificial Neural Network. **[8]**

Q9) a) Explain the typical architecture of expert system. **[8]**

b) What is the difference between expert system and traditional system? State the advantages and disadvantages of Expert system. **[8]**

OR

Q10)a) What are trihedral figures? How Waltz's can be applied to propagate symbolic information? **[8]**

b) What is perception? Give its detailed structure. **[8]**

Q11)a) Explain in detail the semantic analysis phase of natural language processing (NLP). **[8]**

b) What is grammar induction? Explain it in detail. **[8]**

OR

Q12)a) Write short note on Ambiguity and disambiguation. **[8]**

b) Explain the syntactic analysis with suitable example. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2916

[Total No. of Pages : 3

[5354]-129
B.E. (Electronics & Telecommunication)
AUTOMOTIVE ELECTRONICS
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section - I and Q7 or Q8 Q9 or Q10, Q11 or Q12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain with the help of neat diagram Breaking system and cooling system. **[10]**

b) What are the differences in SI & Diesel engine operation? **[8]**

OR

Q2) a) Explain with a neat diagram 4-stroke operation of SI engine? **[10]**

b) What is the basic principle of the fuel cell vehicle? **[8]**

Q3) a) Explain the working principle for sensor operations with respect to: **[8]**
   i) MAP
   ii) Engine speed

b) What are the different types of actuators used in automotive electronics? Explain working Principle of Solenoid & its role in fuel injection system. **[8]**

OR

Q4) a) Explain typical anticollision system. **[8]**

b) Explain with the help of working Principle, characteristics, limitations and usage for the following sensors in context with automotive system
   i) Temperature sensor
   ii) Vibration sensor **[8]**

P.T.O.

Q5) a) Write note on : Traction control system and Steering control system. **[8]**

b) What are different strategies of 'Engine Management System' used in automotive systems? **[8]**

OR

Q6) a) Explain the importance of ABS. How is it implemented? **[8]**

b) Write short notes on: **[8]**

i) Wiper control system

ii) Anti-theft system

SECTION - II

Q7) a) What is the selection criteria for processors of Automotive System. **[10]**

b) Write a C 18 program to toggle only PORT A.4 bit continuously for every 50ms, Use timer 1, 8bit mode, the 1:4 prescalar to create the delay. **[8]**

OR

Q8) a) Draw and explain D.C. Motor Control in wiper application using PIC microcontroller. **[10]**

b) Compare 'soft real time' with 'hard real time' in context with automotive system **[8]**

Q9) a) With the help of proper example, justify the relevance of Communication Protocols in automotive applications. **[8]**

b) With an example, explain utility of GPS & GPRS in automotive environment. **[8]**

OR

Q10)a) Explain the features of CAN. How is it suitable for Data Communication in Automotive Electronics? **[8]**

b) Compare architectural features of ARM 9 and ARM cortex in automotive applications. **[8]**

Q11)a) What are the future trends for emission control? **[8]**

b) Explain the diagnostic coder for automotive. **[8]**

OR

Q12)a) Explain the following **[8]**

i) Multiplex wiring system of automotive

ii) Occupant safety feature in modern car.

b) Compare 'On-board' and 'off-board' diagnostics in automotive application. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2917

[Total No. of Pages : 3

[5354]-130
B.E. (E&T/C)
NANOTECHNOLOGY
(2008 Pattern) (Elective)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Marks indicated to the right are maximum marks.***
2) ***Answers to two section should be written in separate answer books.***
3) ***From section I, answer (Q.1 or Q.2) and (Q.3 or Q.4) and (Q.5 or Q.6).***
4) ***From section II, answer (Q.7 or Q.8) and (Q.9 or Q.10) and (Q.11 or Q.12).***
5) ***Draw neat diagrams wherever necessary.***

SECTION - I

Q1) a) Explain any two scanning probe instruments for measuring Nanostructures. **[8]**

b) What is Nano-scale Lithography? Explain the same in brief. What is self-assembly in nano-structures? Mention the disadvantages and advantages of self assembly techniques. **[8]**

OR

Q2) a) Why Ohms' Law fails for nanostructures? Explain. What are the tools that imagine nano behaviors? **[8]**

b) Explain the Pulsed Laser method to synthesis nano particles. **[8]**

Q3) a) What are the limitations of CMOS technology used for memory design? Explain how Silicon Nanocrystal can be used for Nonvolatile Memory. **[8]**

b) Explain the optical properties of Semiconducting nanoparticles. What are the applications of these nanoparticles? **[8]**

OR

P.T.O.

Q4) a) What is the significance of dielectric constant in materials used for IC fabrication? Explain the high dielectric constant materials and relate the dielectric constant with band gap. **[8]**

b) Explain any one Nano-CMOS device and its application. What should be basic properties of Nano-CMOS device? **[8]**

Q5) a) Explain the structures of any one Carbon Nanoparticle. What are its electrical and mechanical properties? **[10]**

b) Explain any three applications of Carbon Nanotubes? **[8]**

OR

Q6) Write Short Notes on ANY THREE : **[18]**

a) Challenges in Nano scale electronics.

b) Single Electron Transistor.

c) Electron Microscopy.

d) Carbon clusters.

SECTION - II

Q7) a) Explain the merits and demerits of MEMS devices. Explain a simple construction and use of MEMS for any Mechatronics application.**[10]**

b) Describe the fabrication process for MEMS. Identify few tools used at different stages. **[8]**

OR

Q8) a) What is a molecular switch? Describe the operation of a molecular switch and explain how this switch can be used as a logic gates. **[10]**

b) With the help of illustrations explain any one actuator fabricated from nano material. What are the advantages of NEMS? **[8]**

Q9) a) What is Moore's Law? What are the challenges initiated by nano electronics? Explain briefly. **[8]**

b) Explain operation of Tunneling Diode and explain its I-V characteristics. What are the applications of these diodes in digital electronics? **[8]**

OR

Q10)a) What are the limiting performances of CMOS technology with reducing feature size of transistors? Support your answer with various problems arising due to reducing channel length. **[8]**

b) Explain following technologies briefly: Single Electron Transistor (SET), Atomic Lithography. **[8]**

Q11)a) Explain silicon nanostructure memory device. With the help of illustrations explain how these nano memory devices can be arranged to form memory arrays. **[8]**

b) Explain the Non Volatile Memory(NVM) bit cell characteristics and demerits of NVM. **[8]**

OR

Q12)a) Explain the generation of photons and induced emission of light with the help of energy band diagram. Explain what if this band gap is reduced to few armstrongs. **[8]**

b) Briefly explain the capture of light energy and generation of current in photovoltaic cell. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2918

[Total No. of Pages : 3

[5354]-130-A
B.E. (E&TC)
PLC& INDUSTRIAL PROCESS AUTOMATION
(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions form each Section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain with example following types of control systems. **[8]**
   i) Self Regulation
   ii) Human aided control

b) Explain following signal standards used in process industries: **[8]**
   i) Current signal standard
   ii) Pneumatic signal standards

OR

Q2) a) Draw the block diagram of process control and explain each element in brief. **[8]**

b) List various types of control systems? Explain Direct Digital Control and Distributed Control Systems in brief? **[8]**

Q3) a) Why linearization of the sensor is necessary? Discuss various techniques used for linearization? **[8]**

b) A temperature sensor has a span of 20°C to 250°C. A measurement results in a value of 55°C for the temperature. Specify the error if the accuracy is
   i) ± 0.5% full Scale
   ii) ± 0.75% of span
   iii) ± 0.8% of reading
   What is possible temperature in each case? **[8]**

P.T.O.

OR

Q4) a) What is need of transmitter? Explain two wire transmitter topology in detail? **[8]**

b) Explain analog signal conditioning for RTD. **[8]**

Q5) a) Draw the analog circuit for PID mode and explain it. **[8]**

b) Explain different process control loop tuning methods in brief. **[10]**

OR

Q6) a) Explain the On-Off control in brief. **[8]**

b) Explain the various PID implementation with diagram? Discuss the effect of the P.I & D action on system response? **[10]**

SECTION - II

Q7) a) Explain the control valve principle using its basic cross section. **[8]**

b) Explain the Hydraulic actuator in brief. **[8]**

OR

Q8) a) Explain the principle and the various flow control characteristic available for control valves? **[8]**

b) Explain different control valve types. What is control valve sizing? **[8]**

Q9) a) Explain with examples how the progress in digital control is achieved? **[8]**

b) What is Fuzzy logic system? Explain different Fuzzy controllers. **[8]**

OR

Q10)a) Explain ANN based controllers in detail. **[8]**

b) Explain the Statistical Process Control concern to fuzzy logic system in detail. **[8]**

Q11)a) Draw the ladder diagram for the Bottle filling plant. **[8]**

b) Explain the various parts of PLC? Draw the block diagram of I/O cards of PLC? Explain various network topologies used for networking of PLCs? **[10]**

OR

Q12)a) What are the operating modes of PLC? Explain the PLC operating cycle and PLC programming. **[8]**

b) Draw the ladder diagram for a elevator system. **[10]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2919

[Total No. of Pages : 2

[5354]-130-D
B.E. (E&TC)
PROGRAMMABLE SYSTEM ON CHIP
(2008 Pattern) (Open Elective) (Elective - IV)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answer three questions form Section-I and answer three questions from section-II.***
2) ***Answer to the two sections should be written in the separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronics pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Differentiate between PSoC 1 and PSoC 2 in detail. **[8]**

b) Draw the architectural blocks of PSoC 5 with programming. **[8]**

OR

Q2) a) Explain detail interrupt controller of PSoC 1. **[8]**

b) What is features of PSoC3 family and explain additional features of PSoC 5. **[8]**

Q3) a) Explain detail instruction set of PSoC 3. **[8]**

b) Explain DMA of PSoC 3 in detail. **[8]**

OR

Q4) a) Explain 12C and CAN 2.0 of PSoC 5 in detail. **[8]**

b) Explain I/O interfaces and CPU system of PSoC3. **[8]**

Q5) a) Explain any one digital design best practice with PSoC? **[10]**

b) Explain in detail significance of Cypress PSoC. **[8]**

P.T.O.

OR

Q6) a) Explain PSoC memory management. **[8]**

b) Explain detail structure of cypress semiconductor PSoC and explain some limitations. **[10]**

SECTION - II

Q7) a) Explain in detail PSoC creator Boost converter component. **[8]**

b) Explain hardware and software subsystem of mixed signal architecture. **[8]**

OR

Q8) a) Explain detail of PSoC interrupt subsystem. **[8]**

b) Design system using PSoC express. **[8]**

Q9) a) Explain analog routing. **[8]**

b) Explain in detail ADC topologies. **[10]**

OR

Q10)a) Write short note on **[8]**

i) UART

ii) CAN Bus

b) Explain flash temperature sensors and DTMF dialers. **[10]**

Q11)a) Design universal wide range signal generator. **[8]**

b) Explain data acquisition and control system with PSoC. **[8]**

OR

Q12)a) Explain hardware of Manchester decoder & DTMF decoder. **[8]**

b) Explain lower noise continuous time signal processing with PSoC. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2920

[Total No. of Pages : 3

[5354] - 131
B.E. (Electrical)
PLC AND SCADA APPLICATION
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***

2) ***Figures to the right indicate full marks.***

3) ***Answers to the two sections should be written separately.***

SECTION - I

Q1) a) Define Programmable Logic Controller. **[6]**

b) Write a short note on Input and Output module. **[6]**

c) What are different types of PLC? **[6]**

OR

Q2) a) State and explain advantages and disadvantages of PLC in detail. **[10]**

b) Explain block diagram of PLC. **[8]**

Q3) a) Write a short note on On - Timer (Ton). **[8]**

b) Draw the ladder diagram for the following function table. **[8]**

Inputs – I1, I2 Outputs - Q1, Q2, Q3, Q4

I1	I2	Q1	Q2	Q3	Q4
0	0	0	0	0	0
0	1	1	1	1	1
1	0	1	1	1	1
1	1	0	0	0	0

P.T.O.

OR

Q4) a) Explain input analog devices. **[8]**

b) Explain different types of ON/OFF switches. **[8]**

Q5) a) With the help of response curves, explain the effect of only increasing proportional gain of the controller. **[8]**

b) What is tuning of PID controller? **[8]**

OR

Q6) a) Explain DC motor control with DC power source. **[8]**

b) Write a short note on Variable Frequency Drive. **[8]**

SECTION - II

Q7) a) Draw Block diagram of SCADA and explain it in detail. **[8]**

b) Explain various communication technologies used in SCADA system. **[9]**

OR

Q8) a) What are SCADA system desirable properties? Explain. **[8]**

b) State advantages, disadvantages and applications of SCADA. **[9]**

Q9) a) Write a short note on automatic substation control. **[8]**

b) Explain first, second and third generations of SCADA architecture. **[9]**

OR

Q10) a) Write a short note on SCADA system used in Petroleum Refining Process. **[8]**

b) Explain with block diagram use of SCADA in Electric power generation. **[9]**

Q11) a) Explain Open System Interconnection (OSI) model. Also explain functions of OSI model layers. **[8]**

b) Explain Control Net protocol. **[8]**

OR

Q12) a) Explain Control and Information Protocol (CIP). **[8]**

b) Draw and explain IEC61850 layered architecture protocol. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2921

[Total No. of Pages : 4

[5354] - 132
B.E. (Electrical Engineering) (Semester - I)
POWER SYSTEM OPERATION & CONTROL
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Derive the swing equation of synchronous machines from first principle. **[8]**

b) For the system shown in fig 1(b), if fault takes place close to generator on line 2, when power transfer is 1.5 pu in the system and $E = 1.2, V = 1, X'd = 0.2, X_1 = X_2 = 0.4pu$ **[8]**

i) Comment on stability of the system for sustained fault.

ii) Find the critical clearing angle.

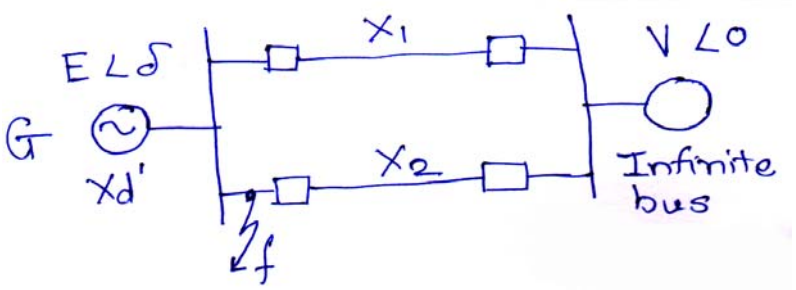


fig 1(b)

OR

P.T.O.

Q2) a) What is transient stability? What are the factors affecting transient stability? Explain the methods for improvement & stability. **[8]**

b) A 3 - ph synchronous generator delivers 1.0 pu power to an infinite bus throught transmission network. The maximum power that can be transferred during prefault, during fault and post fault condition are 2.0 pu, 0.5 pu and 1.25 pu respectively. Find critical clearing angle. Sketch the power angle curves and show the angles & power magnitude on it. **[8]**

Q3) a) What are the sources of reactive power generation? Explain, how the synchronous condensor is used for reactive power generation. State it advantages and disadvantages over static sources. **[8]**

b) Sketch and explain, capability loading curves for 3 - ph synchronous generator for active and reactive power generation. **[8]**

OR

Q4) a) What do you mean by subsynchronous resonance? What are its ill effects. **[8]**

b) Explain the series compensation used for EHV long line. Also obtain the expression for degree of compensation. **[8]**

Q5) Write short note on **[18]**

a) STATCOM

b) UPFC

OR

Q6) Write short notes on **[18]**

a) Thyristor switched capacitor.

b) Comparison between statcom & SVC.

SECTION - II

Q7) a) Define Automatic Generation Control (AGC). Explain with transfer function block the load frequency control of single area case. **[8]**

b) Explain following concepts. **[8]**

i) Droop characteristic of speed governor system.

ii) Speed governor dead band

OR

Q8) a) With neat block diagram and response, explain two area load frequency control. Also explain the concept of Area Control Error (ACE) **[10]**

b) Explain following concepts with reference to automatic generation control;**[6]**

i) Control area and free governor operation.

ii) Generator rate constraint

Q9) a) Define unit commitment, with its necessity. State different methods of Unit Commitment. Explain priority list method with example. **[10]**

b) Explain following constraints with reference to unit commitment task.**[8]**

i) Minimum up time, Minimum down time.

ii) Fuel constraint in case of conventional and non conventional energy sources.

iii) Start up cost and shut down cost.

iv) Thermal and hydro constraints.

OR

Q10) a) Explain with mathematical formulation, the economic load dispatch without transmission loss and including equality constraint of meeting load. **[10]**

b) Consider two thermal units, with following incremental production cost,

$dC1/dP1 = (220 + 1.32 * P1)$Rs / MWh

$dC2/dP2 = (132 + 1.762 * P2)$ Rs/MWh

The minimum and maximum generation limit of each generating unit is 10 MW and 100 MW. Dispatch the following load values such as 50 MW, 175MW and 200 MW at optimum condition. **[8]**

Q11) Explain following types of power interchange with advantages and limitations:**[16]**

a) Energy banking and Power Pools.

b) Capacity interchange and Diversity interchange.

OR

Q12) Explain following mode of power transaction **[16]**

a) Emergency power interchange.

b) Inadvertent power exchange.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2922

[Total No. of Pages : 4

[5354] - 133
B.E. (Electrical) (Semester - I)
CONTROL SYSTEM - II
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Which are the important electrical networks used for compensation of the control system? Derive Transfer Function of any one compensation network & show its pole zero configuration. **[8]**

b) A unity feedback system has an open loop transfer function, $G(s) = \frac{4}{s(s+2)}$ Design a suitable Lead compensator so that phase margin is 50° and Kv = 20/ sec. **[10]**

OR

Q2) a) Explain steps to be taken to design Lag compensator network by Bode plot approach. **[8]**

b) Design a suitable Lag Compensator for the following unity feedback system : G(s) = K/S(1 + 2S); such that Phase margin is 40° and steady state error for ramp input is 0.2. **[10]**

Q3) a) Show that the state model of a control system is not a unique property. **[8]**

P.T.O.

b) The state equation of the system is given by : **[8]**

$$\dot{X}(t) = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

Determine the following :

i) STM &

ii) State Equation for unit step input under zero initial condition.

OR

Q4) a) Obtain solution for homogeneous state equation & State properties of STM. **[8]**

b) Explain derivation of transfer function of control system from its state model. **[8]**

Q5) a) Define Controllability & Observability. Explain any one method to determine it. **[8]**

b) Determine the state controllability and observability of the following system : **[8]**

$$A = \begin{bmatrix} -3 & 1 & 1 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}; \quad B = \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix}; \quad C = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

OR

Q6) a) What is the need of state observer? Explain design of full order state observer. **[8]**

b) For a given system **[8]**

$$A = \begin{bmatrix} 0 & 20.6 \\ 1 & 0 \end{bmatrix}; \quad B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}; \quad C = \begin{bmatrix} 0 & 1 \end{bmatrix}$$

Determine observer gain matrix Ke such that $S_1 = -10$ and $S_2 = -10$ are Eigen values of observer gain matrix.

SECTION - II

Q7) a) Write short note on design specifications in time domain and frequency domain. **[8]**

b) For a unity feedback system $G(s) = \frac{6.63K}{s(s+1.71)(s+100)}$, design a PID controller to meet following specifications. Mp = 25%, ts = 2 sec and kv = 20. **[8]**

OR

Q8) a) Explain Zigler - Nichol method for tuning of PID controller. **[8]**

b) Explain PID controller with its characteristics, applications & its effect on system performance. **[8]**

Q9) a) Give comparison between linear and non linear control system. **[8]**

b) Derive the Describing function for Ideal non - linearity. **[8]**

OR

Q10) a) Explain Describing function method for the analysis of non - linear control system. **[8]**

b) A system with $(s) = \frac{50}{s(s+1)(s+2)}$ includes ideal relay with output equal to ∓ 1 unit. Determine amplitude & frequency of limit cycle by Describing function method. **[8]**

Q11) a) Explain Liapunav's second method and Liapunav's stability theorem. **[8]**

b) Determine the kind of Singularity, find the characteristic equation and draw phase portrait for the following differential equation. **[10]**

$$\ddot{x} + 3\dot{x} + 3x = 0$$

OR

Q12) a) Explain terminologies used for Scalar function : **[6]**

Positive definite, Negative definite, Positive semi definite, Negative semi definite with one example each.

b) Explain whether following quadratic form of system is positive definite or not using Sylverster's Criterion. **[6]**

$$V(x) = 8X_1^2 + X_2^2 + 4X_3^2 + 2X_1X_2 - 4X_1X_3 - 2X_2X_3$$

c) Write short note on phase portrait of nonlinear system. **[6]**

♦♦♦♦

Total No. of Questions : 6]

SEAT No. :

P2923

[Total No. of Pages : 3

[5354] - 134
B.E. (Electrical)
ROBOTICS AND AUTOMATION
(2008 Pattern) (Semester - I) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer to the two sections should be written in separate books.***

2) ***Neat diagrams must be drawn wherever necessary.***

3) ***Figures to the right indicate full marks.***

4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***

5) ***All questions are compulsory.***

SECTION - I

Q1) **Solve any three from the following :**

a) What are different automation types? Explain with neat sketch. **[8]**

b) Give significance of Robotics laws. **[8]**

c) Explain selection criteria of electrical drives for robot design. **[8]**

d) Explain different euler angle systems used in robotics. **[8]**

Q2) **Solve any two from the following :**

a) Differentiate properly between Cartesian Robot and SCARA Robot. **[8]**

b) What is the importance of end effectors used in robot manipulator? **[8]**

c) Explain different types of electrical sensors and actuators used in robots. **[8]**

P.T.O.

Q3) Solve any one from the following :

a) Explain the concept of hand matrix with the effect of pre and post multiplication of a hand matrix by basic homogeneous transformation matrix. **[10]**

b) Give initial point P = [1.5 1.5 2.5] relative to frame B which is coincident with frame A. Apply the following transformations to frame B and hence find coordinates of final point P with respect to frame A. **[10]**

i) Rotate 60° about Z - axis.

ii) Translate (2) units along new X - axis and (–3) units along new Y - axis.

iii) Rotate 30° about new X - axis.

SECTION - II

Q4) **Solve any two from the following :**

a) Find the effect of a differential rotation of 0.05 radians about X - axis followed by a differential translation of $\begin{bmatrix} 0.5 & 0.5 & 0 \end{bmatrix}$ on a frame. **[10]**

$$T = \begin{bmatrix} 0 & 0 & 1 & 5 \\ 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

b) Explain Geometric approach for solution of inverse kinematics and differentiate it with Direct Method. **[10]**

c) The link parameter of a θ - R manipulator, working in a horizontal plane with its θ - axis parallel to the plane of paper, is given in following table - **[10]**

Joint	θ	d	a	α
1	θ_1	d_1	0	90°
2	0	R	0	0

Where, θ_1 - Rotary joint variable and R is Prismatic Joint variable.

i) Draw the diagram showing link coordinate system and robot manipulator.

ii) Derive hand matrix of the manipulator.

d) Explain 'Spray Painting Robot' with details of selection criteria, selection of drives and actuators, methods of control and peripheral devices used. **[10]**

Q5) **Solve any two from the following :**

a) Draw a neat sketch related to 'PUMA Robot' explaining the degrees of freedom. Also show all the coordinate frames attached to the robot. **[8]**

b) Explain with analytical expression about Lagrangian analysis considering single revolute joint. **[8]**

c) Explain manipulator jacobean, Inverse Jocobean and singularities in Jacobean analysis. **[8]**

Q6) **Solve any two from the following :**

a) Explain Online and Offline programming also explain specific programming languages. **[7]**

b) Explain how a robot can be used for part sorting application. **[7]**

c) Explain the method of Resolved Motion Position Control (RMPC) for robot motion. **[7]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2924

[Total No. of Pages : 3

[5354] - 135
B.E. (Electrical)
POWER QUALITY
(2008 Pattern) (403143) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***In Section I, attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6. In section II, attempt Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of non - programmable electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Define and explain the following terms **[10]**

i) Voltage swells

ii) Voltage flicker

iii) Voltage sags and

iv) Voltage interruptions

b) Why power quality is gaining important now a day? Explain various definitions of power quality with reference to each stake holders. **[8]**

OR

Q2) a) Explain various grounding practices as per IEEE standard. **[10]**

b) Why power quality is considered as quality of voltage? Define and explain with suitable diagram Long - Duration Voltage variations and Short - Duration Voltage Variations. **[8]**

P.T.O.

Q3) a) State the principle of regulating the voltage. Explain various devices used for voltage regulation. **[8]**

b) What is voltage flicker? Explain short term and long term flicker. **[8]**

OR

Q4) a) What are the causes of under voltages? Explain various mitigation measures. **[8]**

b) Explain RMS voltage variation and complex power concept in the power systems. **[8]**

Q5) a) Explain voltage sag characteristics such as magnitude, phase angle jump, point on wave initiation and point on wave recovery. **[8]**

b) Explain economic impact of voltage sag and its consequences. **[8]**

OR

Q6) a) Explain various utility mitigation measures for voltage sag. **[8]**

b) Explain influence of fault location and fault level on voltage sags. **[8]**

SECTION - II

Q7) a) Explain in detail stepwise procedure of IEEE 519 - 1992 for harmonic analysis. **[8]**

b) Explain various impacts of harmonics on power system equipments. **[10]**

OR

Q8) a) Explain procedure for design of passive filter. **[8]**

b) What are harmonic resonances? Explain series and parallel resonances. **[10]**

Q9) a) Explain capacitor switching transient and magnification of capacitor switching. **[8]**

b) Explain various computer tools used for transient's analysis? **[8]**

OR

Q10) a) What are transients? Explain transient velocity and the effect of line terminations. **[10]**

b) Explain the operation of surge observer and surge suppressor for protecting power system. **[6]**

Q11) a) What are various approaches to be followed in power quality monitoring? **[8]**

b) Why analysis of data is required? Explain various data collection techniques. **[8]**

OR

Q12) a) Explain selection procedure of transducers for power quality monitoring. **[8]**

b) Explain the role of intelligent systems in power quality monitoring. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2925

[Total No. of Pages : 3

[5354] - 136
B.E. (Electrical)
ILLUMINATION ENGINEERING
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***In Section I, attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6. In section II, attempt Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of non - programmable electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the laws of illumination. **[6]**

b) Derive the relationship between plain angle and solid angle. **[4]**

c) Describe the principle of production of light in detail. **[8]**

OR

Q2) a) Define **[8]**

i) Luminous flux

ii) Luminous intensity

iii) Illumination

iv) Depreciation factor

v) MHCP

vi) Reflection factor

vii) Solid angle

viii) Glare

P.T.O.

b) What are the bad and good effects of light? What are the various methods of controlling natural light? **[10]**

Q3) a) Explain the working of fluorescent tube light. **[8]**

b) Write the short note on LEDs and LASERS. **[8]**

OR

Q4) a) Explain the principle and working of high pressure Mercury Vapour Lamp. **[8]**

b) What is stroboscopic effect in fluorescent tube? **[8]**

Q5) a) Explain the requirements for design of control gear. What are different accessories for gaseous discharge lamp? **[8]**

b) Explain Dimming. **[8]**

OR

Q6) a) List the various types of reflectors. Explain any one with proper diagram. **[8]**

b) List the types of lighting fixtures according to photometric usages. **[8]**

SECTION - II

Q7) a) State the various factors for selection of lamps and luminaries to be used for indoor lighting. **[10]**

b) Explain Zonal cavity method for general lighting design. **[8]**

OR

Q8) a) Write short note on : **[10]**

i) Office lighting

ii) Hospital lighting

b) Design the lighting scheme using beam angles and polar diagrams for educational complex. **[8]**

Q9) a) State and explain road lighting code in India. **[8]**

b) Explain Isolux diagram. **[8]**

OR

Q10) a) Discuss Energy Efficient Lighting. **[8]**

b) Explain the various optical control schemes. **[8]**

Q11) a) Define **[8]**

i) Utilization factor.

ii) Light output ratio

iii) Average illuminance

iv) Luminance yield

b) Explain Energy management in lighting. **[8]**

OR

Q12) Write a short note on **[16]**

a) Photovoltaic lighting

b) Emergency lighting

c) Day lighting

d) Fibre optics system

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2926

[Total No. of Pages : 4

[5354] - 137
B.E. (Electrical)
PROJECT MANAGEMENT
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

UNIT - I

Q1) a) Define Project Management. Clarify its qualities and significance. **[8]**

b) Explain Project life cycle with a well labeled diagram. Express its stages. **[9]**

OR

Q2) a) Explain various characteristics of Project Management. How is Project management carried out in an organization. **[8]**

b) Explain Project Appraisal. State the need for Project Appraisal? **[9]**

UNIT - II

Q3) Project is faced with evaluation of two alternatives A and B. The company cost of capital is 15%. Use Net present value, profitability index and payback period methods to arrive at a suitable decision. **[16]**

	Immediate cash out flow (in Rs. lacs)	cash inflows (in Rs. lacs) at the end of				
		Iyr	IIyr	IIIyr	IVyr	Vyr
Project A	25	-	05	15	20	25
Project B	45	10	15	25	35	45

OR

P.T.O.

Q4) a) State that why project selection is important? Explain the probable causes of project failure. **[8]**

b) State ROI. What is Profitability Index? Why Project cost control is required? **[8]**

UNIT - III

Q5) a) Write the differences between PERT and CPM. What is the significance of critical path? State the concept of crashing, with a well labelled diagram. **[8]**

b) Write short notes on : **[8]**

i) Network Analysis Technique in Project Management

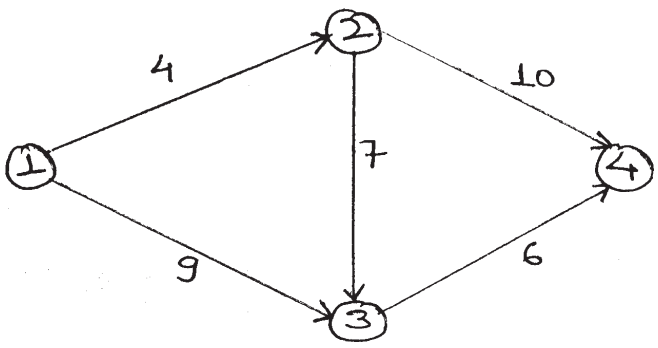
ii) Deployment of Resource

OR

Q6) The following data pertains to the network given below. It is desired to compress the project to the least possible duration day by day and estimate the extra cost. **[16]**

i - j	Normal Time (days)	Crash Time (days)	Cost slope (Rs. per day)
1-2	4	2	400
1-3	9	6	200
2-3	7	4	100
2-4	10	7	200
3-4	6	3	300

Network



UNIT - IV

Q7) a) State the factors for cost escalation. How to take care of them during planning? **[8]**

b) Why budget is required? State the elements to be considered for making a budget? Describe the advantages of budgetary control. **[9]**

OR

Q8) a) Write short notes on : **[9]**

i) Cost scheduling

ii) Budgeting

b) Write short notes on : **[8]**

i) Factors of cost escalation

ii) Budgetary control

UNIT - V

Q9) a) Explain in detail quality planning, assurance and control. **[8]**

b) Name the factors which are important in international project management and how to control them? **[9]**

OR

Q10) a) Explain short notes on : **[9]**

i) International project Management

ii) Quality of procured items.

b) What are the different methods for maintaining the quality of procured items? Describe in detail. **[8]**

UNIT - VI

Q11) a) The expected cash inflows from a project and their probability are as under : **[9]**

Expected cash inflow (Rs.)	Probability
40,000	0.50
50,000	0.60
60,000	0.30
30,000	0.40

The cash inflow acceptable for the project sponsor is Rs. 40,000. What is the certainty equivalent coefficient?

b) The expected cash inflows of a project are estimated as under. **[8]**

Year	Cash inflow (Rs).
1	1,00,000
2	2,00,000
3	3,00,000
4	2,00,000
5	1,50,000

The initial investment required for the project is Rs. 5,50,000/-. The risk adjusted discount rate is 15%. Evaluate as to whether the project proposal is worthwhile.

OR

Q12) a) Write short notes on : **[8]**

i) Computer Aided Project Management

ii) Portfolio risks

b) Write short notes on : **[9]**

i) Diversible and Non - diversible risks.

ii) Monitoring and controlling.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2927

[Total No. of Pages : 3

[5354] - 138
B.E. (Electrical)
RESTRUCTURING & DEREGULATION
(2008 Course)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q5 or Q.6 questions from Section I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12. questions from Section II.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, mollier charts electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What are the key objectives of "Electricity Act 2003" with reference to generation, transmission and distribution sector? **[8]**

b) Discuss the institutional structures of Indian power sector before and after restructuring. **[8]**

OR

Q2) a) How Indian Energy Exchange works for day a head market. **[8]**

b) What are the functions of Ministry of power and PFC. **[8]**

Q3) a) Discuss the following economic terms of power sector. **[8]**

i) Fixed cost and variable cost

ii) Capital cost

iii) Depreciation

iv) Profitability indices.

b) Discuss various consumer tariffs **[8]**

P.T.O.

OR

Q4) a) Explain any two methods to assess the financial feasibility of any project. **[8]**

b) What do you mean by **[8]**

i) Subsidy & cross subsidy

ii) O and M expenses.

Q5) Discuss following methods of regulations : **[18]**

a) Incentive regulation.

b) Rate of return regulation

c) Benchmarking Regulation

OR

Q6) Write short note on : **[18]**

a) CERC

b) Structure of regulatory process in India

c) Role of State Electricity regulatory Commission.

SECTION - II

Q7) Explain following models based on industry structure and contractual arrangements : **[16]**

a) Wholesale Competition

b) Retail Competition

c) Pool and Bilateral trade.

OR

Q8) a) Explain in detail "The California Crisis". **[8]**

b) Compare between 'Competition for the market' and 'Competition in the market'. **[8]**

Q9) a) Discuss power exchange in India. **[9]**

b) Discuss various methods of transmission pricing. **[9]**

OR

Q10) Write short note the following electricity trading models : **[18]**

a) Integrated

b) Wheeling

c) Decentralised

Q11) a) What are the functions of ISO, TRANSCO and LDC? **[9]**

b) Elaborate the three parts of availability based tariff, how they are implemented. **[7]**

OR

Q12) a) Explain the concept of open access and transmission rights. **[8]**

b) What are transmission congestion issues? Explain in detail. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2832

[Total No. of Pages : 5

[5354] - 14

B.E. (Civil Engineering) (Semester - II)

QUANTITY SURVEYING, CONTRACTS AND TENDERS

(2008 Pattern)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I & Answer Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams should be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What is the need for preparing estimation for Civil engineering works. What are the data needed for estimation of **[6]**

i) Roadwork.

ii) Canal work.

iii) Residential buildings.

b) Prepare the quantity of Foundation Cement Concrete, Damp Proof Course and brickwork for a wall of 5m long and height 3.5m, wall thickness of wall 30 cm. **[6]**

c) What are the various deductions to be made during estimation of residential buildings? Explain rules for deduction, addition for plastering work. **[4]**

OR

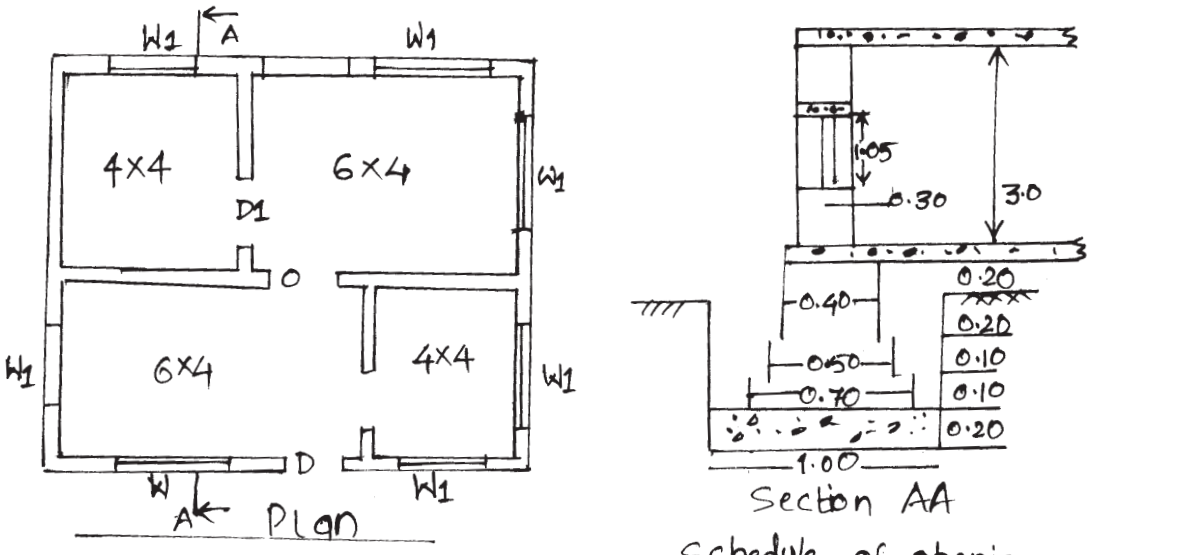
Q2) a) What is the utility of preparing approximate estimation? What are the different methods of preparing approximate estimate and explain any one. **[6]**

P.T.O.

b) Prepare preliminary estimate for an office building to have a carpet area of 1800 sq-m. 10% of the built up area will be occupied by wall, 25% for general amenities like corridors, toilet, stair case etc. In addition to this, 5% of the building cost for electrification, 7.5% for water supply and sanitary connections, other costs at 10% of the building cost. The plinth area rate may be taken as Rs. 1500/ sq-m **[6]**

c) Explain in brief construction item. Write a brief description required in measurement and billing of any item. **[4]**

Q3) Fig.1 shows the plan and section of a residential building. Find the carpet area of the building. **[2]**



(All Dimension in meters) Fig 1

(Q.3)

Prepare a detailed estimate for the following item of work :

a) Earthwork excavation. **[3]**

b) Foundation cement concrete. **[3]**

c) Damp proof course. **[3]**

d) RCC Lintel and workout steel required at 1.5%. **[4]**

e) Internal plastering. **[3]**

OR

Q4) a) Explain the rules and methods for taking out quantity for earth work in Excavation. Explain the term lead and lift in estimation and explain how lead and lift is considered for excavation work. **[8]**

b) What do you understand by DSR and the utility of DSR? **[4]**

c) A wooden door is to be provided for an opening of 1.8 m x 2.1 m. The framework is of size 7.5 cm x 5.5 cm and shutter is 2.5 cm thick. Prepare a detailed estimate of wood work. **[6]**

Q5) a) What is the necessity of drafting specification and what are the factors affecting specification. Explain the method of writing specification. **[6]**

b) Draft a detailed specification for reinforced cement concrete for beams and slabs. **[6]**

c) Explain the general specification for second class building. **[4]**

OR

Q6) a) What is meant by Rate Analysis and what are the various factors affecting rate of item of work. **[4]**

b) A brick masonry work for superstructure is to be constructed. Workout the cost per m^3 of work considering material labor and all other cost involved in construction length 50m, height 3.0 m, thickness of wall 30cm. Local rate for material & labour to be assumed. **[6]**

c) Work out the material, labour required and prepare the rate per sq-m of internal plastering considering all costs affecting the construction local rates for material & labour to be assumed/considered. **[6]**

SECTION - II

Q7) a) An equipment was purchased for Rs. 80,000/- Assuming salvage value Rs. 10,000/- at the end of 5 years, calculate depreciation & book value of the equipment for each year till the end of 5 years. Use constant percentage method. Give answer in tabular form. **[8]**

b) State two differences between each of the following: **[6]**

i) Building lease-Occupation lease.

ii) Depreciation - Obsolescence.

iii) Book value method of valuation - Rental method of valuation.

c) Explain with sketch the belting method for valuation of a plot (land). **[4]**

OR

Q8) a) A self occupied bungalow constructed on a plot of area 600 m^2 in 1985 has built up area of 300 m^2. Present day land and construction costs (in year 2015) are Rs. 1000/- and Rs. 2000/- respectively. Assume 1st class specifications for the construction, future life 50 years and sinking fund accumulation is at the rate of 7%. Find the fair market value of the property in 2015. **[8]**

b) Differentiate between 'straight-line' and 'constant percentage' methods of calculating depreciation including formulas. **[6]**

c) State four types of value of a property and discuss any one of them. **[4]**

Q9) a) Distinguish clearly between prequalification & postqualification of contractors. **[4]**

b) Enlist various types of repair works as per the PWD procedure and explain methods of executing (carrying out) them. **[4]**

c) Discuss global tendering and BOT tendering with examples. **[4]**

d) Explain clearly the terms : technical sanction and administrative approval. **[4]**

OR

Q10) a) Draft a tender notice for an English newspaper for construction of Government Guest House on behalf of executive engineer PWD. Estimated cost of this load bearing G+1 construction of 280 m^2 built up area including the works for paving, garden, porch, etc. is Rs. 27,40,000/- (At least 8 tender essentials must be included in the draft). **[4]**

b) Write a detailed note on original PWD works. **[4]**

c) Explain briefly the precautions to be taken for scrutiny of tenders. **[4]**

d) Write a note on 'Daily Labour Work' by the PWD. **[4]**

Q11) a) What is meant by an 'arbitrator'? Explain the disabilities of an arbitrator. **[4]**

b) Explain the process of arbitration with respect to the Arbitration Act, 1940. **[4]**

c) What do you understand by termination of a contract? Briefly explain three ways in which a contract can be terminated. **[4]**

d) Discuss the requirements to be fulfilled for a contract to be legal or valid. **[4]**

OR

Q12) a) Discuss the meaning and necessity of a 'valid' or 'legal' (lawful)' contract. **[4]**

b) State the advantages of 'Arbitration'. Briefly discuss the matters which cannot be referred to an Arbitrator as per the Arbitration Act of 1940. **[4]**

c) Compare the item-rate contract and lump-sum contract. **[4]**

d) State the expected qualities of an Arbitrator. Explain clearly meaning and necessity of 'sole' and 'joint' Arbitrators. **[4]**

Total No. of Questions : 12]

SEAT No. :

P2928

[Total No. of Pages : 3

[5354] - 140
B.E. (Electrical)
EXTRA HIGH VOLTAGE TRANSMISSION
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any one question from each unit of each section.***
2) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables slide rule, electronic pocket calculator is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

UNIT - I

Q1) a) Derive the expressions for power handling capacity, number of circuits required, line current, power loss in each circuit and percentage power loss in terms of line voltage and line parameters and line length. The power is to be transmitted by three phase overhead ehv line **[8]**

b) Write note on causes of vibrations/oscillations of line due to electrical & non electrical reasons. **[8]**

OR

Q2) a) Derive travelling wave equations and their solutions due to sudden disturbance of the line. **[8]**

b) Write note on attenuation and distortion of travelling waves. **[8]**

UNIT - II

Q3) a) For three phase overhead ehv line, derive expression for inductance matrix and flux linkage matrix in terms of max well's coefficient matrix. **[10]**

b) Derive the expression for GMR of bundle conductors consisting of n subconductors of radius 'r' meter each. **[6]**

P.T.O.

OR

Q4) a) For a fully transposed three phase ehv ac line derive the expression for zero sequence inductances of the conductors in terms of self and mutual inductances. **[8]**

b) Find Maxwell's coefficient matrix for 3 phase 400 KV ehv ac line assume Mo sag to the line. The height of conductors above the ground level is 15 meter spacing between the phases is 11 meter. The diameter of each sub conductor of two subconductor bundle is 3.18 cm and bundle radius is 45.72 cm. **[8]**

UNIT - III

Q5) a) Derive the expression for maximum and minimum surface voltage gradient on sub conductor. State the assumptions made in deriving these expressions hence write the expression for the maximum voltage gradient when "n" sub conductors are there. **[10]**

b) A single conductor of ehv transmission line strung above the ground is made up of ACSR conductor with diameter 0.0635 meter. and line height is 21 meter above the ground the voltage gradient on the conductor is taken as corona inception gradient the corona inception gradient is given by the equation $E_0 = \frac{30 \times 10^3}{\sqrt{2}} \frac{1}{m}\left(1+\frac{0.301}{\sqrt{r}}\right)\frac{volts}{cm} rms$ where m = 1.3, r is radius of conductor in centimeter. Find the voltage to ground of the conductor. Also find capacitance to the ground. **[8]**

OR

Q6) a) Derive maximum charge condition on three phase ac line and hence derive expression for maximum charge. **[10]**

b) What is menat by line charge and point charge? Compare line charge and point charge. **[8]**

SECTION - II

UNIT - IV

Q7) a) Explain what is meant by shock currents. State the factors affecting intensity of shock. Also define "threshold value" of current and "Let go value" of shock current. State the effects of shock currents of different magnitudes on human body. **[8]**

b) Discuss the effects of magnetic fields on human health. **[8]**

OR

Q8) a) Explain what is meant by electrostatic induction. With usual notations explain the procedure of calculating electrostatically induced voltage on ungrounded ground wire. **[10]**

b) Explain the roll of cylindrical cage placing around high voltage overhead conductor during design stage **[6]**

UNIT - V

Q9) a) Draw the three phase full wave bridge circuit and explain the function of each part in the diagram. Also derive expression for ideal dc voltage with out any firing angle delay **[10]**

b) Derive expression for rating of trnasformer in terms of dc voltage and dc current. **[6]**

OR

Q10) a) Explain the operation of converter as an inverter and terms ignition advance angle and extinction advance angle. **[8]**

b) Write note on bridges in series for increasing number of pulses. **[8]**

UNIT - VI

Q11) a) Draw the diagram of one pole of bipolar link. Lable various parts and explain the roll of various main parts in HVDC system. **[10]**

b) Explain the requirements with reasons for satisfactory operation of hvdc system. **[8]**

OR

Q12) a) Explain with diagram actual and ideal VI characteristics of HVDC system. **[10]**

b) State the problems associated with operation of a dc system when connected to weak ac system and remedial actions to overcome the problems. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2929

[Total No. of Pages : 2

[5354] - 141
B.E. (Electrical Engineering)
SMART GRID
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I, and Solve Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from section - II.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Assume suitable additional data if necessary.***

SECTION - I

Q1) a) High light on evolution of electric Grid and the Concept of Smart Grid. **[10]**

b) Write a note on opportunities and barriers in smart Grid. **[8]**

OR

Q2) a) Explain the Resilient and Self Healing grid. **[10]**

b) Give present development and international policies in Smart Grid. **[8]**

Q3) a) Explain how smart Meters can be playing an important role to make a system smart. **[8]**

b) Explain the concept plug in Hybrid Electric Vehicles. **[8]**

OR

Q4) a) Write a note on OMS. **[8]**

b) Explain home and building automation. **[8]**

Q5) a) Write a note on Smart Substation. **[8]**

b) Explain the concept SMES. **[8]**

P.T.O.

OR

Q6) a) Explain any two smart storage equipments. **[8]**

b) Write a note on Geographic information System. **[8]**

SECTION - II

Q7) a) Describe the concept of Micro Grid, and also its need and applications. **[10]**

b) Write a note on, Variable speed wind generator. **[8]**

OR

Q8) a) Discuss different issues of micro grid when interconnected. **[10]**

b) Write a note on, Captive power plant. **[8]**

Q9) a) Why power quality is considered to be an important issue especially in smart grid. **[8]**

b) Highlight on the power quality issues of grid connected renewable energy sources. **[8]**

OR

Q10) a) Describe the EMC and it's role in smart grid. **[8]**

b) Explain the power quality audit and its importance in smart grid. **[8]**

Q11) a) Explain the concept AMI related to smart grid. **[8]**

b) Focus on, Wireless Mesh Network in smart grid. **[8]**

OR

Q12) a) Explain the importance of Bluetooth in smart grid. **[8]**

b) Write a note on, Broadband over power line. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. : ____

P2930

[Total No. of Pages : 3

[5354]-142

B.E. (Electrical)

SWITCHGEAR & PROTECTION

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section -II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Explain arc interruption theories in circuit breaker. **[8]**

b) Write a short note on resistance switching. **[8]**

OR

Q2) a) Explain following term with respect to CB switching **[8]**

i) Restriking voltage

ii) Recovery voltage

iii) RRRV

b) For a 220 uv system the reactance and capacitance upto location of CB is 8Ω and 0.025 μF respectively. A resistance of 600Ω is connected across the contacts of CB. Determine **[8]**

i) Natural frequency of oscillation

ii) Damped frequency of oscillation

iii) Critical value of resistance which will give no trasient oscillation

iv) The value of resistance which will give damped frequency of oscillations one fourth of the natural frequency of oscillation.

P.T.O.

Q3) a) With neat diagram explain construction & working of vacuum circuit breaker. **[8]**

b) Explain important properties of SF_6 gas used in SF_6 CB. **[8]**

OR

Q4) a) With neat diagram explain construction & working of air blast circuit breaker. **[8]**

b) Explain ratings of high voltage circuit breaker. **[8]**

Q5) a) With neat diagram explain principle of operation of **[10]**

i) Distance relay

ii) Differential relay

b) Explain primary & back-up protection. What do you mean by Zones of protection. **[8]**

OR

Q6) a) With neat diagram explain construction & working of directional over current (induction type) **[10]**

b) Explain following terms **[8]**

i) Current setting

ii) Pick-up current

iii) PSM

iv) Time selling & TSM

SECTION - II

Q7) a) Compare static relays with electromechanical relays with respect to construction, working principle, advantages and limitations. **[8]**

b) Explain the least square method for estimating of phasor. **[8]**

OR

Q8) a) Write a short note on **[8]**

i) Anti-Aliasing filter

ii) Sampling theorem

b) Sketch and explain phasor measurement unit(PMU). **[8]**

Q9) a) Explain the phenomenon of overfluxing in the transformer and protection used against it. **[8]**

b) A 3 phase 12kV alternator winding is required to be protected against earth faults. The 80% of winding is protected against earth faults by a relay having pick up current of 1Amp. The CT has a ratio of 1000/5. Calculate resistance to be connected between neutral and ground. If resistance of 10 ohms is connected between neutral to ground, how much percentage of winding is protected against earth fault. **[8]**

OR

Q10)a) Explain the need of high impedance relay for differential protection of busbar. **[8]**

b) Explain the abnormal conditions like unbalance loading, overspeeding and loss of prime mover in case of alternator. **[8]**

Q11)a) Explain the step distance protection scheme for transmission line. Also draw the neat sketch for the same. **[8]**

b) Explain the effect of resistance and power swing on the performance of distance relay. **[10]**

OR

Q12)a) Write a short note on Wide Area Measurement System (WAM). **[8]**

b) Explain how reactance relay is used for distance protection. Derive its torque equation. Draw its characteristics on R-X diagram. **[10]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. : ____

P2931

[Total No. of Pages : 4

[5354]-143

B.E. (E&TC)

INDUSTRIAL DRIVES AND CONTROL

(2008 Pattern) (Elective) (Semester - II)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) A drive has the following parameters T = 200 – 0.2N, N-m where N is the speed in rpm. Load torque T_l = 100, N-m. Initially the drive is operating in steady-state. The characteristic of the torque are changed to = –200 – 0.2N, N-m. Calculate initial and final equilibrium speeds. For given drive also calculate the time from initial speed to final speed, if J = 20kg – m^2. **[8]**

b) Explain nature and classification of load torques. **[8]**

OR

Q2) a) Explain load equalization using flywheels in electrical drives. **[8]**

b) A motor is equipped with a flywheels is to supply a load torque of 100Nm for 10 sec followed by a light load period of 200Nm long enough for flywheel to regain its steady state speed. It is desired to limit the motor load torque to 700Nm. What should be moment of inertia of flywheel? Motor has inertia of 10 kg-m^2. Its no load speed is 500 rpm and slip at a torque of 500Nm is 5%. Assume speed torque characteristic of motor to be straight line in the region of interest. **[8]**

P.T.O.

Q3) a) Explain closed loop control of a separately excited DC motor with suitable block diagram. **[8]**

b) Explain, plugging method for braking operation of following drives. **[10]**

i) DC shunt motor

ii) Three phase induction motor

OR

Q4) a) A 400V, star connected 3-phase 6-pole, 50Hz, induction motor has following parameters referred to stator: $R_s = R'_r = 1\Omega$, $X_s = X'_r = 2\Omega$ For regenerative braking operation of this motor determine: **[8]**

i) maximum overhauling torque it can hold and range of speed for safe operation

ii) Speed at which it will hold an overhauling load with a torque of 100 N-m

b) A 220V, 970 rpm, 100A DC separately excited motor has an armature resistance of 0.05Ω. It brakes by plugging from an initial speed of 1000rpm. Calculate **[10]**

i) Resistance to be placed in armature circuit to limit braking current to twice the full load value

ii) Braking torque

iii) Torque when the speed has fallen to zero

Q5) a) Explain operation of chopper controlled DC shunt motor drive with suitable waveforms. **[8]**

b) A 230V, 1500 rpm, 50A separately excited DC motor has armature resistance 0.5Ω and assumes that motor is operating in continuous conduction mode. The motor is controlled by three phase fully controlled converter with source voltage of 440V, 50Hz. A star delta connected transformer is used to feed the armature so that motor terminal voltage equals rated voltage when converter firing angle is zero.

i) Calculate transformer turns ratio

ii) Determine when firing angle when a motor current is 1200 rpm and rated torque. **[8]**

OR

Q6) a) Explain operation of three-phase fully controlled converter fed separately DC motor drive with suitable waveforms and derive relation between speed and firing angle. **[8]**

b) Explain operation of chopper controlled DC series motor drive with suitable waveforms. **[8]**

SECTION - II

Q7) a) A delta-connected squirrel cage induction motor has following ratings and parameters **[8]**

400V, 50Hz, 4-pole, 1420rpm,

$R_s = 0.35\Omega$, $R'_r = 0.4\Omega$, $X_s = 0.7\Omega$, $X'_r = 0.8\Omega$.

The motor is fed from a voltage source inverter. The drive is operated with a constant v/f control up to 50Hz and at rated voltage above 50Hz. Calculate

i) Frequency for motoring operation at 950 rpm and full load torque

ii) Torque for frequency 40Hz and speed of 1100 rpm

b) Explain closed loop control of CSI fed induction motor drives with neat block diagram. **[8]**

OR

Q8) a) Explain regenerative braking of VSI fed induction motor drives. **[8]**

b) With neat diagram, explain $\frac{v}{f}$ = constant speed control method for induction motor. **[8]**

Q9) a) Explain energy saving opportunities in induction motor driving pump and blower. **[8]**

b) What are different losses in electrical drives and also enlist energy conservation measures. **[8]**

OR

Q10)a) Explain energy conservation using static rotor resistance control in induction motor. **[8]**

b) Explain thermal model of motor for heating and cooling. **[8]**

Q11) Write short note on : **[18]**

a) Flux oriented vector control of induction motor.

b) Electrical Drives in Paper Mills.

c) Electrical Drives in Traction Mills.

OR

Q12) Write short note on : **[18]**

a) Commutatorless DC motor drive

b) Electrical Drives in Textile

c) Electrical Drives in Sugar Mills

❖❖❖❖

Total No. of Questions : 12]

SEAT No. :

P2932

[Total No. of Pages : 3

[5354]-144
B.E. (Electrical)
VLSI DESIGN
(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt Q.1. or Q.2, Q.3. or Q.4, Q.5. or Q.6, Q.7 or Q.8, Q.9 or Q.10 & Q.11 or Q. 12***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate marks.***
4) ***Use of logarithmic tables, slide rules, Mollier Charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Each section should be solved on separate answer sheets.***

SECTION - I

Q1) Using Structural modelling Draw schematic and write VHDL code for 16:1 MUX using 4:1 MUX as a component. **[16]**

OR

Q2) Explain function and procedure with VHDL example. **[16]**

Q3) a) Implement the following:
- i) Σm (0, 5, 6, 7, 9, 12,15) Using 16: 1 Mux. **[6]**
- ii) Implement 16: 1 Mux using only 4: 1 Mux **[6]**

b) Compare high level language and VHDL language. **[6]**

OR

Q4) a) What is the need of synchronous counter? Draw Mod 6 synchronous and asynchronous counter. **[6]**

b) Draw and explain 4 bit PISO shift register. **[6]**

c) Draw state table state diagram and Implement 101 detector. **[6]**

P.T.O.

Q5) a) Define and explain in brief: **[9]**

i) package
ii) Architecture
iii) Configuration.

b) Draw ckt. of 3 bit adder and write its VHDL code **[7]**

OR

Q6) a) What is an architecture? What are its types? Explain any one of it with example. **[8]**

b) Write VHDL code for MOD 6 counter also draw its timing diagram. **[8]**

SECTION - II

Q7) a) Explain w.r.t. CMOS and give std. Values of **[10]**

i) Fan in.
ii) Fan out.
iii) Power dissipation.
iv) Figure of merit.
v) Noise margin.

b) Compare PMOS, NMOS & CMOS **[6]**

OR

Q8) a) Explain any 4 data - types and 4 data objects of VHDL. **[8]**

b) Explain configuration with example in VHDL code. **[8]**

Q9) a) Explain sub-program overloading using VHDL code. **[8]**

b) Explain the concept of package & Explain it with one Example in VHDL. **[8]**

OR

Q10)a) Implement following gates using CMOS: **[8]**

i) NOT. ii) AND.
iii) OR iv) EX-OR.

b) Explain the voltage transfer characteristics of CMOS inverter in detail. **[8]**

Q11)a) Draw the Architectural layout of FPGA. **[8]**

b) Explain the complete process of simulation and synthesis in detail. **[10]**

OR

Q12)a) Explain the Architecture of CPLD along with its detailed diagram. **[8]**

b) Explain the process of place and route and simulation with its types in detail. **[10]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2933

[Total No. of Pages : 3

[5354]-145
B.E. (Electrical Engineering)
HIGH VOLTAGE ENGG.
(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Your answers will be valued as a whole.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Derive Townsend's criterion for breakdown in gaseous. Explain limitations of Townsend's theory of breakdown and Explain limitations of Paschens Law. **[12]**

b) A steady current of 600μA flows through the plane electrode separated by a distance of 0.5cm when a voltage of 10kv is applied. Determine the Townsends first ionization coefficient if current of 60μA flows. When the distance of separation is reduced to 0.1cm and field is kept constant at the previous value. **[4]**

OR

Q2) a) Explain Streamer theory of Breakdown in gaseous. **[8]**

b) State and explain various factors affecting breakdown of gaseous dielectrics**.** **[8]**

Q3) a) Explain following breakdown phenomenon of solid insulating material **[12]**

i) Thermal Breakdown
ii) Treeing and Tracking
iii) Intrinsic Breakdown

b) Explain mechanism of breakdown in composite dielectric **[6]**

P.T.O.

OR

Q4) Explain **[18]**

i) Suspended particle theory

ii) Cavitation and Bubble Theory

iii) Stressed oil volume theory related to Solid insulating materials.

Q5) a) Explain various reasons for switching surges. **[8]**

b) Explain statistical method for insulation co-ordination. **[8]**

OR

Q6) a) Explain different theories of charge formation in clouds. **[8]**

b) Explain Modern power system protection devices (any 2). **[8]**

SECTION - II

Q7) a) Describe with a neat sketch Cockroft Walton Voltage Multiplier Circuit: **[8]**

b) A 10 stage Cockraft-Walten circuit has all capacitors of 0.06micro Farad. The secondary voltage of the supply transformer is 100kv at a frequency of 150Hz. If the load current is 1 mA, determine **[8]**

i) Voltage regulation

ii) The ripple

iii) The optimum number of stages for maximum output voltage

iv) The optimum output voltage

OR

Q8) a) What is an impulse wave ? Draw a standard wave from. What is a chopped waveform? Why and when it occurs? **[8]**

b) A 12-stage impulse generator has 0.2 μF capacitors. The wave front and the wave tail resistance connected are 600 ohms and 4000 ohms respectively. If the load capacitor is 1000 pF, find the front and tail times of the impulse wave produced. **[8]**

Q9) Explain different types of potential dividers. Compare them on the basis of merits, demerits and applications. **[16]**

OR

Q10)a) Describe Peak Voltage Measurement according to Chubb and Fortescue. **[8]**

b) With a neat diagram explain generating voltmeter and its applications. **[8]**

Q11)a) Explain any one wet and dry test. **[8]**

b) Write down various tests conducted on circuit breaker. Explain any Two. **[10]**

OR

Q12)a) Describe impulse testing carried on lightening arrestors. **[9]**

b) Describe temperature cycle test and pollution testing on insulators. **[9]**

Total No. of Questions : 12]

SEAT No. :

P4280

[Total No. of Pages : 3

[5354]-146

B.E. (Electrical)

DIGITAL SIGNAL PROCESSING

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***

SECTION - I

Q1) a) Define following and give one example of each- **[6]**

i) Casual and non-casual sequence

ii) Linear and non-linear sequence

b) Determine whether following signals are energy or power signals- **[6]**

i) $x(n) = \cos \frac{2\pi}{5} n$

ii) $x(n) = u(1 - n)$

c) Given that u(k) is a unit step discrete signal. Perform the following operations on the signals and obtain the result graphically. **[6]**

i) u(k – l)

ii) u(– k + 3)

OR

Q2) a) Explain the process of A/D conversion with neat diagram. **[6]**

b) Compute the convolution x(n) of the sequence xl(n) = {0.6, –l,l.5} x2 (n) = {–2,3,0.2,0.7} using tabular Method. **[6]**

c) State Six advantages of Digital Signal Processing over Analog Signal Processing. **[6]**

Q3) a) What is Fourier Transform? State differentiation and time reversal properties of Fourier Transform. **[6]**

P.T.O.

b) Obtain the Z-transform of the following and sketch the ROC **[10]**

i) $x(n) = 0.7^n u(n) + 0.6^n u(n-1)$

ii) $x(n) = \{1,2,3,\underset{\uparrow}{5},7,0,1\}$

OR

Q4) a) Obtain Inverse Z- Transform of following- **[6]**

$$X(z) = \frac{z^2 + z}{z^3 - 3z^2 + 3z - 1} \text{ for ROC}|z|>1.$$

b) Obtain Fourier Transform for the following- **[10]**

i) $x(n) = 2^n u(n)$

ii) $x(n) = x(n-2)$

Q5) a) State and explain any two types Ideal frequency selective filters with neat diagram. **[6]**

b) A LTI system has impulse response h(n) given by- **[10]**

$h(n) = -0.5\delta(n+1) + 0.25\,\delta(n) - 0.125\delta(n-1)$

Obtain its frequency response.

OR

Q6) a) Derive the expression for frequency response of first order system. **[6]**

b) Write short note on four types of Generalized Linear Phase Systems. **[10]**

SECTION - II

Q7) a) Obtain DFT of – delayed unit impulse $\delta(n + n_0)$. **[6]**

b) Perform circular convolution of the two sequences by Graphical Method **[6]**

$x(n) = \{1,2,3,5\}$ and $h(n) = \{1,1,2,-1\}$

c) Obtain 4-point DFT of the sequence- **[6]**

$x(n) = \{0,1,3,5\}$ using DIT FFT

OR

Q8) a) State it's any four properties of twiddle factor. **[6]**

b) Compute 4-point DFT of the sequence $x(n)=u(n-1)-u(n-3)$ using twiddle factor. **[6]**

c) Obtain 4-point DFT of the sequence-

$x(n)=\{0,1,3,5\}$ using DIF FFT. **[6]**

Q9) a) Explain about Ideal filter characteristics & necessity of approximations. **[6]**

b) Design a Butterworth digital IIR low-pass filter for the following specifications:- **[10]**

Pass-band gain required: - 1dB;

Frequency up to which pass-band gain must remain more or less steady: 20Hz.

Amount of attenuation required :-20dB

Frequency from which the attenuation must start: 85 Hz.

Sampling frequency: 500 Hz.

OR

Q10)a) Differentiate between impulse invariant and bilinear transformation techniques. **[6]**

b) Design a low-pass FIR filter using for the following specifications:- **[10]**

Cut-off frequency = 600 Hz

Sampling frequency = 1000 Hz

Order of filter = 8

Filter length required = 9

Note: Use Hanning window.

Q11)a) Determine the Direct form-I & Direct Form-II realization of the system characterized by the transfer function **[6]**

$$H(z) = \frac{z+3}{1.5z^2+5z+3}$$

b) Write short note on Applications of DSP in – i) Power factor correction, ii) Harmonic Analysis & measurement **[10]**

OR

Q12)a) Obtain the cascade structure of the FIR filter defined by the TF- **[6]**

$H(z) = (5 + 6z^{-1} + 7z^{-2})/(1 + z^{-1})(1 + 2z^{-2})$

b) Write short note on Applications of DSP to – i) DSP based vibration analysis system ii) Spectrum Analysis. **[10]**

Total No. of Questions : 12] **SEAT No. :**

P2935 **[Total No. of Pages : 2**

[5354]-147

B.E. (Electrical Engineering)

ANN & IT'S APPLICATION TO ELECTRICAL ENGINEERING

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answer Q.1 or 2, Q.3 or 4, Q.5 or 6, Q.7 or 8, Q.9 or 10, Q.11 or 12.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Enlist various intelligent tools and compare any one tool with ANN. **[9]**

b) Explain Single neuron model and hence give significance of weights and biases. **[9]**

OR

Q2) a) Explain mathematical treatment for evaluating activation function for any neuron model. **[9]**

b) Explain Biological inspiration of artificial neural network with neat sketch. **[9]**

Q3) a) Explain MLP model with neat sketch and mathematical expression. **[8]**

b) Explain supervised and unsupervised methods for ANN. **[8]**

OR

Q4) a) Draw and explain recurrent neural network. Explain its activation function in detail. **[8]**

b) What is Error - correction learning for artificial neural network? **[8]**

P.T.O.

Q5) a) Explain Perceptron architecture with neat sketch. **[8]**

b) What is least mean square algorithm used in ANN. **[8]**

OR

Q6) a) What is linear separability? Explain with neat sketch. **[8]**

b) Explain feed forward neural network. **[8]**

SECTION - II

Q7) a) What is Back propagation algorithm and its error evaluation? **[9]**

b) Explain momentum coefficient needed in neural network. **[9]**

OR

Q8) a) Give step by step procedure of Back-propagation method. **[9]**

b) What is learning rate in back propagation method? **[9]**

Q9) a) Explain ART1 with neat sketch. **[8]**

b) Explain BAM theory. **[8]**

OR

Q10)a) What is Kohonen Organizing Maps? **[8]**

b) Explain theory of Adaptive Response Theory. **[8]**

Q11)Explain reconfiguration of power system using ANN. Assume 4 bus system. **[16]**

OR

Q12)Use ANN to solve the risk assessment in power system network. **[16]**

Total No. of Questions : 12]

SEAT No. :

P2936

[Total No. of Pages : 2

[5354]-148
B.E. (Electrical)
MODELLING OF ELECTRICAL SYSTEMS
(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Write a short note on per unit system and normalization technique used in modelling of synchronous motor. **[9]**

b) Explain park's transformation used in modelling of synchronous machine. **[9]**

OR

Q2) a) Explain in detail the basic model of synchronous machine used in modelling. **[9]**

b) Write short note on : **[9]**

i) Flux linkage equations.

ii) Mechanical equations used in modelling of synchronous machines.

Q3) a) Give the detailed procedure for formulation of state space equations used in modelling of synchronous machine. **[8]**

b) Give the procedure of determination of machine parameters from manufactures data. **[8]**

OR

Q4) a) Explain simplified model of synchronous machine. **[8]**

b) Write short note on various time constants used in modelling of synchronous machines. **[8]**

P.T.O.

Q5) Elaborate the method used for modelling of excitation system components. **[16]**

OR

Q6) Give the detailed procedure for modelling of complete excitation system. **[16]**

SECTION - II

Q7) a) What do you understand by the term 'linear transformation as used in electrical machines? Illustrate your answer with suitable example. **[8]**

b) Draw circuit model of induction motor and explain it in detail. **[8]**

OR

Q8) a) On what basics transformations carried out in electrical machines. Explain any one. **[8]**

b) Explain 2 axis model of induction motor. **[8]**

Q9) Write down the voltage and current equations for the modelling of induction motor and hence obtain an expression for the torque when balanced three phase supply is given to stator. **[18]**

OR

Q10) Write down the voltage and current equations used in modelling of induction motor in **[18]**

a) Stator reference frame

b) Rotor reference frame

c) Synchronously rotating frame

Q11) What is the significance of load modelling. Write down in details the various types of static load modeling used for load flow analysis. Discuss about the assumptions and approximation if any. **[16]**

OR

Q12) a) Derive the model of phase shifting transformer. **[8]**

b) Explain voltage dependence of equivalent loads & derivation for equivalent load powers. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2937

[Total No. of Pages : 2

[5354]-149

B.E. (Electrical Engineering)

RENEWABLE ENERGY SYSTEM

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, from section-I, and Solve Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12, from section-II.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Assume suitable additional data, if necessary.***

SECTION - I

Q1) a) Explain Distributed Generation with fossil fuels and describe Concentrating Solar Power Technologies. **[8]**

b) Write a note on "Economics of Distributed Resources". **[8]**

OR

Q2) a) Write a note on, "Biomass for Electricity". **[8]**

b) Write a note on, "Demand side Management". **[8]**

Q3) a) Write a note on, types of wind turbine. **[8]**

b) Give simple estimates of wind turbine energy. **[10]**

OR

Q4) a) Explain how variation in Tower Height varies the different parameters in Wind Energy System. **[8]**

b) Explain, the specific wind turbine performance calculations. **[10]**

P.T.O.

Q5) a) Explain the concept, "Altitude Angle of the Sun at Solar Noon". **[8]**
b) Write a note on, Monthly Clear-Sky Insolation. **[8]**

OR

Q6) a) Explain the Solar Position at any Time of the Day. **[8]**
b) Write a note on, Solar Radiation Measurement. **[8]**

SECTION - II

Q7) a) Explain the basic semiconductor physics used in photovoltaic to convert sun light into electricity. **[8]**
b) Explain the impacts of Temperature and Isolation on I-V curves. **[8]**

OR

Q8) a) Explain the PV I-V Curve under Standard Test Conditions. **[8]**
b) Write a note on Cast Multi crystalline Silicon. **[8]**

Q9) a) Write note on, Major Photovoltaic System Types. **[8]**
b) Explain the grid-connected PV system economics. **[10]**

OR

Q10)a) Explain the concept of "Peak-Hours" Approach to Estimate the PV Performance. **[10]**
b) Write a note on Bi-directions metering. **[8]**

Q11)a) Explain Nuclear energy power plant. **[8]**
b) Write a note on, Global warming and climate change. **[8]**

OR

Q12)a) Write a note on Wave energy conversion systems. **[8]**
b) Write a note on Kyoto Protocol. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P 4278

ss[Total No. of Pages : 3

[5354]-15

B.E. Civil

Transportation Engineering - II

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, and Q.5 or Q.6 from Section-I Q7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12 from section-II***
2) ***Answer to the two sections should be written in separate books.***
3) ***Figures to the right indicate full marks***
4) ***Use of logarithmic tables, slide rule, Mollies charts, electronics pocket calculator and steam tables is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) Describe the method of preparation of Master plan and its phasing for road development program. **[8]**

b) Write a short note Third Twenty Year Road Development Plan **[8]**

OR

Q2) a) Explain in brief the classification of roads as per Nagpur Road Plan **[8]**

b) Explain in brief the Following: **[8]**

i) Traffic Volume Survey ii) Passenger Car Unit

Q3) a) Define Stopping Sight Distance. Derive an equation for calculation of SSD for level road. **[9]**

b) Discuss in brief the necessity of providing Super elevation on Horizontal Curves. **[8]**

P.T.O

OR

Q4) a) What do you mean by Gradient? State various types of gradients. Also states the values of gradients recommended by IRC. **[9]**

b) Discuss in brief various types of highway drainage system **[8]**

Q5) a) Discuss in brief Los angles Abrasion Test on Aggregate and its significance **[9]**

b) Explain with a neat sketches various types of Joints in Cement Concrete Pavement **[8]**

OR

Q6) a) Explain in brief Penetration Test on Bitumen and its significance **[9]**

b) Explain in brief the following: **[8]**

i) Wheel load stresses

ii) Temperature stresses

SECTION - II

Q7) a) Explain in brief the following: **[8]**

i) Terminal Building

ii) Flaps

iii) Tricycle under carriage

iv) Fuselage

b) Discuss types of survey to be carried out for site selection of an Airport? **[8]**

OR

Q8) a) Explain the Wind Rose Type I with the help of a neat sketch **[9]**

b) How Runway orientation should be done? Discuss **[8]**

Q9) a) A bridge needs to be constructed across an Alluvial stream carrying a discharge of 300 Cumecs. Calculate the depth of maximum scour when the bridge consists of, Two spans of 35 m each Assume the value of silt factor = 1.1 **[9]**

b) Define Free board. Why it is necessary to provide free board in all types of bridges. **[8]**

OR

Q10)a) Explain the various methods, giving formulae, to find out runoff from the catchment **[9]**

b) Explain the following: **[8]**

i) Cable stayed bridges

ii) Lift bridges

Q11)a) Draw neat sketches of any three types of piers **[9]**

b) Write a short note on Erection and Maintenance of Bridges **[8]**

OR

Q12)a) How will you account for the following in the design of Highway Bridge **[9]**

i) Impact effect of Live Load

ii) Wind Load

iii) Centrifugal Force

b) Explain in brief the necessity and types of bridge bearings **[8]**

Total No. of Questions : 12]

SEAT No. :

P2938

[Total No. of Pages : 3

[5354]-150

B.E. (Electrical)

DIGITAL CONTROL SYSTEMS

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7or Q.8,Q.9 or Q.10, Q.11 or Q.12.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Explain sampling theorem. What are the practical aspects of selection of sampling rate? **[8]**

b) A discrete system is given as:
Y (n) = x (-n) + 5u (n+1); with proper justification determine whether the system is **[8]**

i) Static or Dynamic
ii) Linear or Nonlinear
iii) Shift invariant or shift variant
iv) Stable or Unstable.

OR

Q2) a) Describe advantages and limitations of DCS. **[8]**

b) Explain the sampling and reconstruction process, state the sampling theorem and give its importance. **[8]**

Q3) a) Derive the Z-transform of any THREE standard test signals. **[8]**

b) Determine the Z-transform and ROC of the following signals. **[8]**

i) $X(n) = [3(4)^n - 5(3)^n]\, u(n)$, using Linearity property.
ii) $X(n) = (\cos w_o n)\, u(n)$----use Euler's identity

P.T.O.

OR

Q4) a) Explain different methods of obtaining inverse Z-transform. **[8]**

b) Determine Inverse Z-transform of the following : **[8]**

i) $X(z) = \dfrac{z-4}{(z-1)(z-2)^2}$ By partial fraction expansion

ii) $X(z) = \dfrac{4Z}{(z+0.5)^2}$ for IZI > 0.5

Q5) a) Show with proper diagrams mapping of left Half of the S-plane is into Z-plane. **[9]**

b) Examine the stability of the system by Jury's test, whose characteristic equation is: **[9]**

$F(z) = Z^4 - 1.2Z^3 + 0.07\,Z^2 + 0.3\,Z - 0.08 = 0$

OR

Q6) a) Describe the general rules for constructing the Root Loci in designing LTI discrete time control system. **[9]**

b) The characteristic equation of discrete time unity feedback control system is given by **[9]**

$Z^3 + (3K)\,Z^2 + (K+2)Z + 4 = 0.$

Determine the range of gain K for stability of the system by use of Jury's Stability test.

SECTION - II

Q7) a) Discuss the various methods used for computation of state transition matrix (STM) from the given state difference equation x(k+ 1) = Gx(k) + Hu(k) **[8]**

b) Evaluate the pulse transfer function $\dfrac{Y(z)}{U(z)}$ from the state variable model of a discrete time system with usual notation. **[8]**

$$x(k+1) = \begin{bmatrix} 0.8 & 1 \\ 0 & 0.5 \end{bmatrix} x(k) + \begin{bmatrix} 1 \\ 0.5 \end{bmatrix} u(k); \quad Y(k)=[10]x(k)$$

OR

Q8) a) Explain clearly with neat diagrams, the direct, cascade and parallel decompositions of Discrete time pulse transfer function. **[8]**

b) Obtain STM & its solution of the difference equation x(k + 1)=Gx(k) Where **[8]**

$$G=\begin{bmatrix} 0 & 1 \\ -0.2 & -1 \end{bmatrix};\quad X(0)=\begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

Q9) a) What is principle of duality? Explain the effect of pole-zero cancellation on controllability & observability. **[8]**

b) Given **[8]**

$$\mathrm{x}(k+1)=\begin{bmatrix} 0.1 & 0.1 & 0 \\ 0.3 & -0.1 & -0.2 \\ 0 & 0 & -0.3 \end{bmatrix}\mathrm{x}(k)+\begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}u(k)$$

& y(k) = [1 0 1]x(k) Determine controllability& observability of system.

OR

Q10)a) Explain full order Observer with proper block diagram. **[8]**

b) Design a full state observer for the system having **[8]**

$$\mathrm{G}=\begin{pmatrix} 0 & 20.6 \\ 1 & 0 \end{pmatrix};\quad \mathrm{H}=\begin{bmatrix} 1 \\ 0 \end{bmatrix};\quad \mathrm{C}=\begin{bmatrix} 0 & 1 \end{bmatrix}$$

Desired Eigen values of observer matrix are

Z = –1.8 + j2.4, and Z = – 1.8 – j2.4.

Q11)a) Draw a neat block diagram of digital position control scheme and Explain the function of each block **[8]**

b) Obtain the Cascade realization of **[10]**

$$D(z)=\frac{z^3+3z^2+7z+5}{z^3+3z^2+9z+14}$$

OR

Q12)a) Explain Stepper motor control with proper block diagram. **[8]**

b) Obtain the direct realization of **[10]**

$$D(z)=\frac{z^2+5z+2}{z^3+6z^2+4z+1}$$

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2939

[Total No. of Pages : 3

[5354] - 151
B.E. (Instrumentation & Control)
PROCESS INSTRUMENTATION
(Semester - I) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain different types of process variables and their selection criteria in process control. **[8]**

b) Explain in brief dynamics of Single and Multi - capacity processes. **[8]**

OR

Q2) Clarify the following terms : **[16]**

a) Time constant of a process.

b) Degrees of freedom

c) Interacting & Non - interacting lags

d) Natural period of oscillation.

Q3) a) Draw the Faceplate of SLPC. Enlist specifications of SLPC. **[8]**

b) Explain analysis of Flow control loop. **[10]**

OR

P.T.O.

Q4) a) Explain in brief Loop gain and its effect on stability. **[8]**

b) Apply Scaling & find out normalized (Scaled) equation for Heat Exchanger, as per following data : **[10]**

i) Steam flow rate Ws = 0 to 3000 pounds per hour

ii) Latent heat of steam Hs = 1010 Btu per pound.

iii) Process fluid flow rate Wp = 0 to 24990 pounds per hour.

iv) Specific heat of Process fluid Cp = 1 Btu per pound

v) Outlet Temperature T2 = 50 to 250°F

vi) Outlet Temperature T1 = 0 to 100°F

Energy balance equation of heat exchanger is

$$HsWs = CpWp(T2 - T1)$$

Q5) a) Explain procedure of determining tuning constants for good control performance. **[8]**

b) Explain the control performance measures for S.P. changes. **[8]**

OR

Q6) a) Explain following terms of practical applications of feedback control **[8]**

i) Control Algorithm

ii) Input processing

b) Explain in brief purpose of Correlations for Tuning Constants. **[8]**

SECTION - II

Q7) a) Explain in brief Dead Band & Velocity Limiter. **[8]**

b) Explain cascade control with suitable example. **[8]**

OR

Q8) a) Explain Ratio control strategy with suitable example. **[8]**

b) Explain benefits of feed - forward plus feedback control using typical application. **[8]**

Q9) a) Explain effect of Interaction and its effect on control performance in Multivariable control. **[8]**

b) Explain enhancement of multiloop control performance using decoupling. **[8]**

OR

Q10) a) Explain Relative gain array method for interaction analysis in multivariable process control. **[8]**

b) Discuss on Multiloop control performance through Single Loop Enhancements. **[8]**

Q11) a) Explain with suitable example Fuzzy sets and Fuzzy rules. **[8]**

b) Explain in brief Model Predictive Controller. **[10]**

OR

Q12) Write short note on **[18]**

a) Smith predictor

b) Dynamic Matrix Controller.

c) Internal Model Controller.

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2940

[Total No. of Pages : 3

[5354] - 152
B.E. (Instrumentation & Control)
DIGITAL CONTROL
(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***

2) ***Answers to the two sections should be written in separate books.***

3) ***Neat diagrams must be drawn wherever necessary.***

4) ***Figures to the right indicate full marks.***

5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare Analog Control System and Digital Time Control System. **[8]**

b) State Sampling Theorem and explain in short Phenomenon of Aliasing and Folding. **[8]**

OR

Q2) a) Define Impulse Sampling and Explain it with the help of diagram. **[10]**

b) Define Zero Order Hold and First Order Hold. **[6]**

Q3) a) List the advantages of Velocity from over the Positional form of Digital PID Controller. **[8]**

b) Derive an equation and show the block diagram representation of Velocity form of Digital PID Controller. **[10]**

OR

P.T.O.

Q4) a) Compare Positional form and Velocity form of Digital PID Controller. **[10]**

b) Explain the concept of Deadbeat Response with neat diagram. **[8]**

Q5) a) State and explain the necessary and sufficient conditions for Jury's Stability Test. **[8]**

b) Write a short note on Bilinear Transformation. **[8]**

OR

Q6) a) Check the stability of the system as shown below by using Bilinear Transformation. **[8]**

$$P(Z) = Z^4 - 2Z^3 + 7Z^2 - 2Z - 1$$

b) Compare the Jury's Stability and Bilinear Transformation. **[8]**

SECTION - II

Q7) a) Diagonalize the following matrix by Similarity Transformation. **[8]**

$$G = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 6 & -11 & 6 \end{bmatrix}$$

b) Explain what is Similarity Transformation and what is the need of this transformation. **[8]**

OR

Q8) a) Write a short note on State Feedback Gain Matrix. **[8]**

b) Define the following terms : **[8]**

i) State Vector

ii) State Variable

Q9) a) State the duality property of the Controllability and Observability. **[4]**

b) Consider the discrete time control system defined by the equation **[12]**

$$X(K + 1) = G\,X(K) + H\,U(K)$$

$$G = \begin{bmatrix} 0 & 1 \\ -0.16 & -1 \end{bmatrix};\ H = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

Determine the suitable State Feedback Gain Matrix 'K' such that the system will have the close loop poles at $Z = 0.5 + j0.5$ and $Z = 0.5 - j0.5$.

OR

Q10) a) Define State Observability and explain the various tests used to check state observability. **[8]**

b) Write a short note on Pole Placement and its need. **[8]**

Q11) Consider the discrete time control system defined by the equation **[18]**

$$X(K + 1) = G\,X(K) + H\,U(K)$$

$$G = \begin{bmatrix} 1 & 1 \\ -0.5 & 0 \end{bmatrix};\ H = \begin{bmatrix} 1 \\ 1 \end{bmatrix};\ X(0) = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

Determine the Optimal Control Law to minimize the following performance index also find J_{MIN}.

$$J = \frac{1}{2} X^*(4) S\, X(4) + \frac{1}{2} \sum_{K=0}^{3} [X^*(K) Q\, X(K) + U^*(K) R U(K)]$$

$$Q = S = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\ R = 1$$

OR

Q12) a) What is performance index? Obtain the riccati equations for optimal state regulator. **[10]**

b) Discuss any one application of Optimal Control. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2941

[Total No. of Pages : 3

[5354] - 153
B.E. (Instrumentation)
PROJECT ENGINEERING & MANAGEMENT
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***All questions are compulsory.***

Q1) a) What is Project Management? "An effective project management is a Challenge in Industry". Explain your views & Justify the same. **[8]**

b) What is Functional Organization? Draw the structure of a functional organization. **[8]**

OR

Q2) a) What are the different properties of Projects? How they are characterized? **[8]**

b) Explain Strengths & Weaknesses of Project Organization? **[8]**

Q3) a) Explain the different Project deliverables? Enlist & explain the same in brief. **[8]**

b) What are different methods of monitoring project performance? Explain the Project S - curve method as a basic tool. **[8]**

OR

Q4) a) What is WBS? Explain its six different purposes of WBS. **[8]**

b) Explain basic steps involved in assembling a Project Team. Explain your views on building a Project Team. **[8]**

P.T.O.

Q5) a) Give Hazardous area classification? Explain its effect on Project Design. **[8]**

b) Draw PFD for Temperature Control of Heat exchanger by Feedback control method. **[5]**

c) Develop P&ID for above control loop. **[5]**

OR

Q6) a) Develop ISA Forms S20 for **[10]**

i) Resistance Temperature Sensors.

ii) Pressure Control valve.

b) Write short notes on : **[8]**

i) Instrument Index Sheet

ii) Temperature Pressure Sheet

Q7) a) Explain What Loop Wiring diagram is? Develop a loop wiring diagram for Temperature Control Loop in Q.No. 5b with Temperature Indicator. **[8]**

b) Explain cable selection guidelines w.r.t. specific applications for cables to be used in Engineering Project. **[8]**

OR

Q8) a) Explain the importance of installation sketches. Draw an installation sketch for differential pressure sensing flow transmitter. **[8]**

b) Prepare BOM for Temperature Control Loop in Q.No. 5b with Temperature Indicator. **[8]**

Q9) a) Explain following terms w.r.t. Project Engineering. **[10]**

i) Contractor Liaison

ii) Selection of Bidders List.

b) Develop Purchase order for the instruments required in Control of Loop developed in Q.No. 5b. **[8]**

OR

Q10) a) Explain the Purchase procedure in an Engineering Organization. **[10]**

b) What is Tender? Develop a Tender for purchase of bulk Flow Control Trainer System. **[8]**

Q11) a) Explain Operator Interface Philosophy. **[8]**

b) Explain the checklist for Inspection of Control Panel. **[8]**

OR

Q12) a) Draw & Explain Conventional Control room? **[8]**

b) Explain need for Air Conditioning & Room Pressurization. How it is achieved. **[4]**

c) Explain Ergonomic Considerations Design of Control Panels. **[4]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2942

[Total No. of Pages : 2

[5354] - 154
B.E. (Instrumentation & Control)
BIOMEDICAL INSTRUMENTATION
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***

2) ***Answers to the two sections should be written in separate books.***

3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain cell potential? How to measure the same. **[8]**

b) List the various types and characteristics of electrodes for recording biopotential. **[8]**

OR

Q2) a) Define half cell potential? How to remove the same while measuring biopotential? **[8]**

b) Define Ergonomics and explain ergonomic design in Operation table. **[8]**

Q3) a) Explain different chambers of heart. Explain an electrical conduction system of heart. **[8]**

b) Explain 12 standard lead configurations. **[8]**

OR

Q4) a) Explain different types of electrocardiographs. **[8]**

b) Explain and design ECG calibrator. **[8]**

Q5) a) Explain Trueplethysmography and its applications. **[8]**

b) What is CO? List the methods to measure the same? **[10]**

P.T.O.

OR

Q6) a) Describe in brief various techniques used for blood flow measurement. **[10]**

b) Explain movement artifact and how to remove the same. **[8]**

SECTION - II

Q7) a) What is EEG? What are various waveforms of EEG. Enlist them and give their significance? **[8]**

b) Enlist various illness and diseases for which EEG is effectively used. **[8]**

OR

Q8) a) Explain 10 - 20 electrode placements for EEG recording. **[8]**

b) Explain various EEG recording modes. **[8]**

Q9) a) Differentiate between direct and indirect ophthalmoscope. **[8]**

b) List instrument used for measurement of IOP. **[8]**

OR

Q10) a) What are three main sections of Human auditory system? Explain the impedance matching in human hearing phenomenon. **[10]**

b) Explain natural process and regulation of breathing? **[6]**

Q11) a) What is Spirogram? Draw and explain wedge spirometer for respiratory measurement. **[10]**

b) Draw and explain air flow measurement techniques. **[8]**

OR

Q12) a) Explain safety codes and standards. **[10]**

b) Draw and explain the block diagram of servo controlled Ventilator. **[8]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2943

[Total No. of Pages : 3

[5354] - 155
B.E. (Instrumentation & Control)
LASER BASED INSTRUMENTATION
(2008 Pattern) (Semester - I)(Elective-I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, mollier charts electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are the components of laser system and explain in brief. **[8]**

b) Define population inversion with the help of neat diagram? Estimate the relative population of two energy levels such that a transition from a higher level to lower level will give visible radiation of 633 nm at room temperature. **[8]**

OR

Q2) a) Explain the importance of Einstein's equations in emissions of radiation. **[8]**

b) Determine the threshold gain for a beam of light undergoing a round trip in laser cavity. **[8]**

Q3) a) How the laser products are classified for safety standards? **[4]**

b) Explain the construction and working of Argon - Ion laser. **[8]**

c) What are the types of hazards to the eye and skin from lasers? Discuss. **[6]**

OR

P.T.O.

Q4) a) What are the classes of laser? Explain each in brief. **[9]**

b) What are the steps that should be followed in a safe laser laboratory operation. **[4]**

c) What are the types of hazards to the eye and skin from lasers? **[5]**

Q5) a) Compare different basic optical interferometers? **[8]**

b) How is a laser vibrometer used to test a tower? Discuss. **[8]**

OR

Q6) a) What is Speckle Pattern? Describe subjective and objective speckles. **[8]**

b) Describe how Fabry - Perot interferometer is used with small coherent length source for displacement measurements. **[8]**

SECTION - II

Q7) a) Explain the frequency domain processing of Doppler signal in detail. **[8]**

b) Compare the two options for the electronic processing of the Doppler signal. **[8]**

OR

Q8) a) How can velocimeter are used as interferometer? Discuss. **[8]**

b) Explain the time domain processing of laser Doppler signal in detail with the help of block diagram and waveforms. **[8]**

Q9) a) Specify the technical features of the gyroscopes according to the principle of operation. **[8]**

b) Explain the basic configuration of Ring Laser Gyroscope in detail. **[8]**

OR

Q10) a) List out the components required for all fiber Fiber Optic Gyroscope configuration. **[8]**

b) Explain in detail the closed loop configuration of Fiber Optic Gyroscope. **[8]**

Q11) a) Discuss how holographic interferometery is applied for measurement of mechanical vibrations. **[9]**

b) Explain how the holographic interferometer is used measure the in - plane displacements. **[9]**

OR

Q12) a) What are the basic approaches to determine the strain? Explain any one in detail. **[9]**

b) Write a short note on Holographic Interferometry. **[9]**

♦♦♦♦

Total No. of Questions : 12]

SEAT No. :

P2944

[Total No. of Pages : 3

[5354]-156

B.E. (Instrumentation & Control)

ADVANCED CONTROL SYSTEM

(2008 Pattern) (Elective - I) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

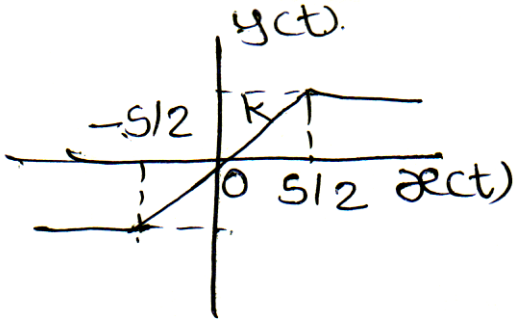
Instructions to the candidates:

1) ***Answer Q. 1 or 2, Q.3 or 4, Q.5 or 6, Q.7 or 8, Q. 9 or 10, Q.11 or 12.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What is the nonlinear control system? Explain any two typical nonlinearities in brief. **[8]**

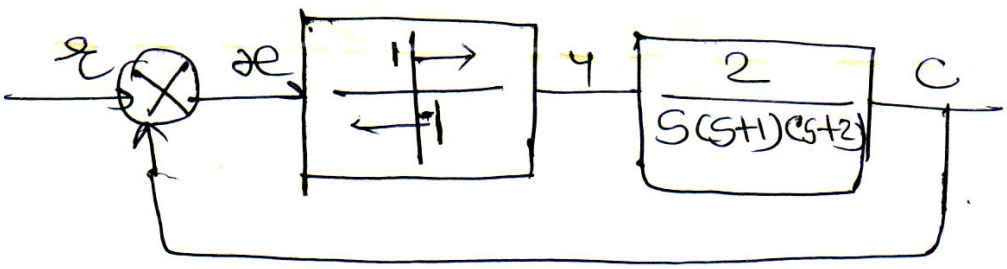
b) Determine the describing function of the saturation nonlinearity. **[10]**



OR

Q2) a) Compare linear & nonlinear control systems. **[8]**

b) Obtain the stability of a system shown in figure by using describing function method. **[10]**



P.T.O.

Q3) a) A second order system represented by $\dot{X}=AX$ Where $A = \begin{bmatrix} 0 & 1 \\ -1 & -1 \end{bmatrix}$ by using Liapunov's direct mthod, determine the stability of the system. **[10]**

b) Explain stability analysis by describing function method. **[6]**

OR

Q4) a) Determine whether following quadratic form is positive definite or not $Q(x) = 10x_1^2 + 4x_2^2 + x_3^2 + 2x_1 x_2 - 2x_2 x_3 - 4x_1 x_3$. **[8]**

b) Explain in brief jump resonance. **[8]**

Q5) a) Explain with neat diagram basic configuration of adaptive control system. **[8]**

b) Explain in detail MIT rule approaches for designing of model reference adaptive controller. **[8]**

OR

Q6) a) In MRAC we want the error e = y – ym to go to zero. For this find a Liapunov function and adaptation mechanism to achieve it for given first order system. **[10]**

Process : $\dot{y} = -ay + bu$

Model : $y_{\dot{m}} = -amym + bmuc$

Where am > 0 and reference uc is bounded controller: $u = Q_1 uc + Q_2 y$

b) Explain in brief direct & indirect model reference adaptive control with block diagram. **[6]**

SECTION - II

Q7) a) Explain self tunning regulator using block diagram. **[8]**

b) Explain indirect self tuning regulator using least squares estimator for Ay(t) = B(u(t) + V(t)) where y is the output, u is the input of the process and V is a disturbance. Also give the algorithm for obtaining it. **[10]**

OR

Q8) a) Explain recursive estimator used in self tuning regulator. **[8]**

b) Explain in detail LQG self tuning regulators. **[10]**

Q9) a) Explain adaptive control technique for temperature control in CSTR system. **[8]**

b) Explain in detail general purpose adaptive regulator. **[8]**

OR

Q10)a) Explain application of adaptive controller in distillation column control **[8]**

b) List different industrial products incorporating adaptive control. Explain any one in detail. **[8]**

Q11)a) Explain requirements for formulation of an optimal control problem. **[8]**

b) Discuss performance measures for optimal control problems. **[8]**

OR

Q12)a) Obtain the control law which minimizes the performance index. **[10]**

$$J = \int_0^\infty (x^2 + u^2)dt$$

for the system.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

b) Explain the necessary conditions of optimality. **[6]**

Total No. of Questions : 12]

SEAT No. :

P2945

[Total No. of Pages : 3

[5354]-157
B.E. (Instrumentation & Control)
BUILDING AUTOMATION - I
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers of two sections should be written in separate answer books.***
2) ***Figures to right indicate full marks.***
3) ***Use of electronic calculator is allowed.***

SECTION - I

Q1) a) Explain the Conventional FAS with neat sketch. Enlist drawbacks of Conventional FAS. **[10]**

b) Explain Addressable FAS with neat sketch. What are the advantages of Addressable FAS on Conventional FAS? **[8]**

OR

Q2) a) Explain SLC with Interface card, CLASS A IDC and CLASS BIDC. Draw NFPA style 4 and style 7 SLC loops. **[12]**

b) Explain SLC communication protocols. **[6]**

Q3) a) What is principle of LHS cables? Explain types and Applications of LHS cables. **[10]**

b) Explain spot detectors placement with neat sketches. **[6]**

OR

Q4) a) Explain fire sprinkler systems with neat diagram. How sprinkler monitoring is done? **[10]**

b) Enlist the different elements of control panel of FAS, Discuss input and output elements. **[6]**

Q5) a) Classify the Fire Alarm Systems according to NFPA72.Explain all FAS in brief. **[12]**

b) Explain Cause Effect Matrix. **[4]**

OR

P.T.O.

Q6) a) Explain installation guidelines for Audible and Visible Notification Appliances made by NFPA for private and public modes. **[12]**

b) Write short note on BS 5839 fire standard. **[4]**

SECTION - II

Q7) a) Draw a block diagram of Access Control Model, explain model with Access matrix. **[8]**

b) What do you mean credential in Access control? List different types of credentials. Give one application of each. **[8]**

OR

Q8) a) Define term Biometrics, Explain biometrics used in Access control system with its types, technical issues and applications. **[10]**

b) Explain 26 bit and 31 bit Weigand format. **[6]**

Q9) a) Give the Specification of camera, Lens, video process, monitor and Panning device for following buildings applications, Hotels, Departmental Stores, Jewellery shop, Banks, Hospitals, Ware houses, ATM's, Financial Institutions, Manufacturing units. **[14]**

b) Explain the term PoE. **[4]**

OR

Q10)a) Give all system specifications of PAL, NTSC, and SECAM video broadcast standards. **[10]**

b) Write short note on MPEG-4 type compression. **[8]**

Q11)a) What are Intrusion Detection Systems (IDS)? Explain the basic elements of PIDS. **[8]**

b) Explain various types of Intrusion Detection System. **[8]**

OR

Q12)a) Why Control Room is called as Hub of CCTV surveillance system? Explain Control Room Activities. **[8]**

b) Give the detail architecture of Perimeter Intrusion Detection System required for Airport security. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2946

[Total No. of Pages : 3

[5354]-159
B.E. (Instrumentation & Control)
NANO INSTRUMENTATION
(2008 Pattern) (Elective - II) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) What is Nanolithography? Describe Photolithography Process in detail. State other lithography techniques. **[7]**

b) What is Top-down and Bottom-up process? Describe two self-Assembly Techniques with suitable diagrams. **[7]**

c) What is Ballistic Transport of electrons? Give the important parameters on which electron transport depends at Nano-scale. **[4]**

OR

Q2) a) Explain energy sub-bands and density of states in Nano-scale structures viz, in a **[7]**

i) Quantum Dot

ii) Quantum Wire and

iii) Quantum well.

b) Describe PVD & CVD techniques for the synthesis of Nano materials. **[7]**

c) Give the Optical and Magnetic Properties of Nano materials. **[4]**

Q3) a) Give the principle, set up and operation of an AFM with different modes in detail. **[8]**

b) Describe the main types of interatomic forces involved in the tip sample interaction of an AFM with suitable diagrams. **[8]**

OR

P.T.O.

Q4) a) Describe the principle, setup and operation of a STM with different modes. Give the origin of tunneling current. **[8]**

b) Write a note on Scanning Near-field Optical Microscope and give the requirement for Near-field imaging. **[8]**

Q5) a) Describe CNT based transistor device in detail. **[8]**

b) Discuss the various properties and applications of CNT. **[8]**

OR

Q6) a) What are the features of CNT that makes them good microwave absorbing materials. Describe RF filter based on CNT array. **[8]**

b) Write a note on CNT based Resonant Tunneling Diode. **[8]**

SECTION - II

Q7) a) Describe GMR effect and Tunneling Magneto Resistance effect with suitable diagrams. **[8]**

b) Describe a Spin Valve device with a suitable diagram. **[8]**

OR

Q8) a) Explain the terms, spin transport, spin injection, spin relaxation, spin polarization and magnetic moment. **[8]**

b) Write a note on spin filtering device & give its applications. **[8]**

Q9) a) Explain the Resonant Tunneling Diode and Transistor with its structure and operation. **[8]**

b) What is FET? Explain the MOSFET transistor's structure and working. Give the effect of scaling down. **[8]**

OR

Q10)a) Describe single electron transistor. Give the conditions required for the discrete nature of the single electron charge transfer along with coulomb blockade. **[8]**

b) What do you mean by Meso-scopic devices? What is a ballistic rectifier? Explain the device structure and its operation. **[8]**

Q11)a) Write a short note on Molecular switch. **[6]**

b) Explain Nano-mechanical sensor in detail. **[6]**

c) Write a note on Single Photon source based on quantum dot with a suitable diagram. **[6]**

OR

Q12)a) Explain Nano wire based Optical Waveguide in detail. **[6]**

b) Write a note on Optical Antenna with diagram. **[6]**

c) Explain CNT based electron emitting device. **[6]**

Total No. of Questions : 12]

SEAT No. :

P2947

[Total No. of Pages : 3

[5354]-160

B.E. (Intrumentation & Control Engineering)

ADVANCED DIGITAL SIGNAL PROCESSING

(2008 Pattern) (Elective - II) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain sampling rate interpolation by integer factor. **[6]**

b) What is principle of Downsampling? What is the importance of antialiasing filter? Derive the expression for decimated output signal i.e. $y(m)$. **[12]**

OR

Q2) a) Explain how multirate sampling can be used efficiently in **[12]**

i) Sub-band coding

ii) Acquisition of high quality data.

b) With aid of block diagram and waveform explain sampling rate conversion by non-integer factor. **[6]**

Q3) a) Explain forward and backward linear predictions. **[8]**

b) Define discrete time random signals and the analysis of random signals. **[8]**

OR

Q4) a) Explain the schemes to solve the normal equations. **[8]**

b) Explain linear predictive coding with the help of any one example. **[8]**

P.T.O.

Q5) a) Define energy spectral density and explain its properties. **[6]**

b) Obtain the energy density spectrum of the sampled data sequence {0, 1, , 0, 1, 0, 1,0,1} and compare it with what you would expect for a square waveform. **[10]**

OR

Q6) a) Explain the periodogram with its properties. **[6]**

b) Explain spectral analysis of any one example using auotregressive model **[10]**

SECTION - II

Q7) a) Explain the main components of the adaptive filter. **[6]**

b) Explain the implementation of the basic least mean square algorithm. **[10]**

OR

Q8) a) Describe the recursive least square algorithm in detail. **[10]**

b) Explain the limitations of recursive least square algorithm. **[6]**

Q9) a) What should be the desirable architectural features, execution speed, type of arithmetic and wordlength required for selecting a DSP processor. **[10]**

b) What are the different data types supported by the TMS320 C67xx DSP processor? Also explain their ranges in detail. **[8]**

OR

Q10)a) Draw the functional block diagram of DSP TMS320C6713 CPU. Explain any five salient features of TMS 320C6713 processor. **[8]**

b) Write in short **[10]**

i) How MAC unit can be efficiently used for convolution?

ii) Fetch packet and execute packet

Q11)a) Explain Fourier transform in short with its limitations. **[8]**

b) Write a short note on short time fourier transform. **[8]**

OR

Q12)a) Write a short note on continuous wavelet transform. **[8]**

b) Differentiate between continuous wavelet transform and discrete wavelet transform and Draw the Haar wavelet and Daubechies wavelet. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2948

[Total No. of Pages : 3

[5354]-162

B.E. (Instrumentation & Control)

PROCESS DYNAMICS & CONTROL

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

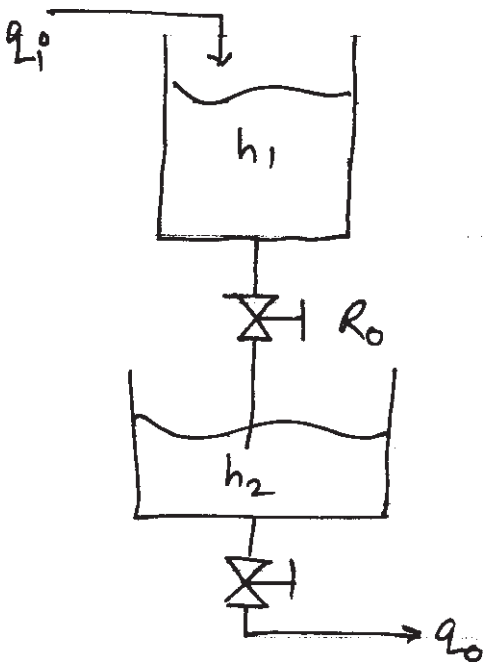
Instructions to the candidates:

1) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain Dynamic behavior of 2nd order system with an example. **[8]**

b) Develop mathematical model of following system. **[8]**

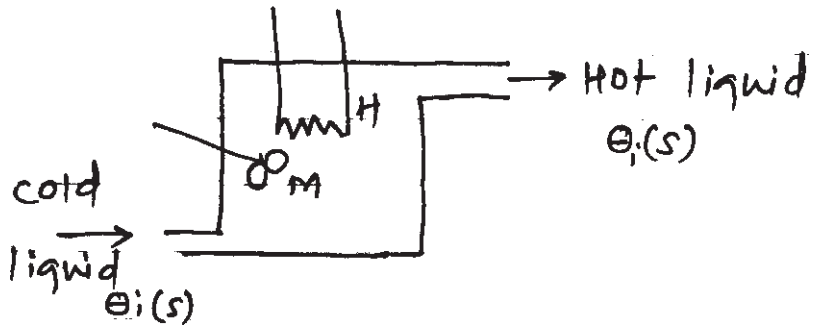


OR

Q2) a) Comment on stability of non-linear system. **[8]**

b) Develop mathematical mode of following thermal system. **[8]**

P.T.O.



where, H : Heater
M : Mixer
Assume suitable data

Q3) a) Explain feed forward control of heat exchanger system. **[8]**
b) Explain measurement lags in exchanger system. **[8]**

OR

Q4) a) Explain exchanger response to changes in steam temperature. **[8]**
b) Explain cascade control of heat exchanger system. **[8]**

Q5) a) Differentiate between 2-element & 3-element boiler drum level control strategy. **[8]**
b) Explain with neat sketch feed forward control of feedwater in boiler system. **[10]**

OR

Q6) a) Explain steam temperature control strategy in boiler system. **[8]**
b) Explain boiler interlocks. **[10]**

SECTION - II

Q7) a) Draw & explain end-point detection strategy of continuous reactor system. **[8]**
b) Explain p^H control strategy of reactor system. **[8]**

OR

Q8) a) Explain batch production management in reactor system. **[8]**
b) Explain flow control in reactor system. **[8]**

Q9) a) Explain distillate reflux flow control scheme in distillation system. **[8]**

b) Explain control of overhead & bottom composition in distillation system. **[8]**

OR

Q10)a) Explain operation of distillation system. Write mass & energy balance equations. **[8]**

b) Explain column feed control scheme in distillation system. **[8]**

Q11)a) Explain types of compressors & their general characteristics. **[10]**

b) Comment on "selection between centrifugal or positive displacement pumps. **[8]**

OR

Q12)a) Explain design aspects of waste-water treatment plant. **[10]**

b) Explain pump characteristics - Q-H curve, power curve & efficiency curve. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2950

[Total No. of Pages : 2

[5354]-164

B.E. (Instrumentation and Control)

ADVANCED BIOMEDICAL INSTRUMENTATION

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from section I and 3 questions from section II.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of neat diagram, explain the ventricular inhibited pacemaker. **[8]**

b) Explain the different types of defibrillators. **[8]**

OR

Q2) a) It is required to set up an ICU for 8 beds. Elaborate the implementation plans. **[8]**

b) list typical ranges of pacemaker parameters. **[8]**

Q3) a) Explain the need and working of blood cell counters. **[10]**

b) Explain the working of an Electrophoresis and its applications. **[8]**

OR

Q4) a) Explain Telemedicine System. **[8]**

b) Distinguish between frequency division multiplex system and time division multiplex system used in the transmission of biosignals. **[10]**

Q5) a) Explain the principle of CT-scanning. How it overcomes the drawback of X-Ray imaging? **[8]**

b) Describe the various components in X ray machine. **[8]**

P.T.O.

OR

Q6) a) Mention the different applications of X-ray examination. **[8]**

b) Draw the diagram of image intensifier and explain how it helps to improve the image qualify in fluoroscopy. **[8]**

SECTION - II

Q7) a) Describe various types of gantries used in CT scanner. **[8]**

b) Draw the diagram of ultrasound scanner and explain its working. **[8]**

OR

Q8) a) With the help of a suitable block diagram, explain the working of rectilinear Scanner. **[8]**

b) Explain ultrasound Diathermy. **[8]**

Q9) a) Why to use various method of imaging and list them. **[8]**

b) What is an Endoscope? Explain its construction with the help of neat diagram. **[8]**

OR

Q10)a) Explain in brief various types of dialysers used for Hemodialysis. **[8]**

b) List any four points of comparison for Hemodialysis and Peritoneal dialysis techniques. **[8]**

Q11)a) Describe various Orthotic and Prosthetic devices. **[8]**

b) Explain different types of wheelchair and joysticks .Specify their materials and properties. **[10]**

OR

Q12)a) What is kidney stone? Explain lithotripsy based on acoustic shock wave with plasma explosion. **[8]**

b) Explain Instrumentation in Hemodialysis. **[10]**

Total No. of Questions : 12]

SEAT No. :

P2951

[Total No. of Pages : 3

[5354]-165

B.E. (Instrumentation and Control)

FIBER OPTIC INSTRUMENTATION

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from section I and section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) With a suitable ray diagram, explain 'Total Internal Reflection'. How 'Total Internal Reflection' is achieved in an optical fiber? **[8]**

b) Explain with suitable diagrams (any three) : **[9]**

i) Acceptance angle

ii) Numerical Aperture

iii) Skew rays

iv) Evanescent field

OR

Q2) a) An optical fiber has a numerical aperture of 0.22 and cladding refractive index of 1.553. Determine **[6]**

i) The acceptance angle for the fiber in water of refractive index of 1.333

ii) The critical angle at the core-cladding interface.

b) Differentiate between Step Index Fiber and Graded Index Fiber on the basis of structure, refractive index profile and applications. **[6]**

c) With suitable diagram, explain Goos-Haenchen shift. **[5]**

P.T.O.

Q3) a) What do you mean by signal degradation in an optical fiber? Discuss various signal degradation mechanisms in an optical fiber. **[9]**

b) Write a note on 'Optical Time Domain Reflectometer' (OTDR). Also describe the role of OTDR in distributed optical fiber sensing. **[8]**

OR

Q4) a) Compare stimulated Brillouin and stimulated Raman scattering in optical fibers. **[6]**

b) Explain the reasons for pulse broadening in optical fiber. **[6]**

c) Differentiate between Microbending and Macrobending. **[5]**

Q5) a) What are the requirements for a source in an optical fiber. Enlist some sources, which are used in optical fiber. **[8]**

b) Compare PN diode with P-I-N photodiode. **[8]**

OR

Q6) a) What is difference between splices and connectors. Describe any two types of splices in optical fibers with suitable diagrams. **[8]**

b) Describe the mechanical fiber misalignment insertion losses in an optical fiber. **[8]**

SECTION - II

Q7) a) What are the attractive features of Optical Fiber Sensors? Also enlist some of the limitations of optical fiber. **[9]**

b) Write a note on 'Intensity Modulation based Optical Fiber Sensors' based on following points **[9]**

i) Principle of operation with diagram

ii) Advantages and disadvantages

iii) The parameters, measured by this type of sensors

OR

Q8) a) What are the characteristics of light, which may be monitored in sensing applications? Describe one technique of sensing which is based on phase modulation. **[10]**

b) Write a note on 'Encoding based position sensors'. **[8]**

Q9) a) What is 'Optical Fiber Brag Grating'? Explain with suitable diagram working of 'Optical Fiber Brag Grating'. **[10]**

b) Explain a fabrication technique of 'Optical Fiber Brag Grating'. **[6]**

OR

Q10)a) What do you understand by 'Distributed Optical Fiber Sensing'? Enlist the advantages of Distributed Optical Fiber Sensing. **[8]**

b) Explain Distributed Optical Fiber Sensing for the dam structure monitoring. What are limitations of this type of sensing? **[8]**

Q11)a) What do you understand by 'Integrated Optics Device'? What are advantages of Integrated Optical Devices over conventional optical devices? **[8]**

b) Explain with the aid of suitable diagrams, following integrated optical devices: **[8]**

i) Beam splitter

ii) Directional coupler

OR

Q12)a) Sketch the major elements of a fiber amplifier and describe the operation of the device. Indicate the benefits of fiber amplifier technology in comparison with that associated with silicon laser amplifiers (SLAs). **[12]**

b) What are the advantages of Optical Amplifiers over conventional electric amplifiers used in optical applications? **[4]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2952

[Total No. of Pages : 3

[5354]-166
B.E. (Instrumentation and Control)
PROCESS MODELLING AND OPTIMISATION
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***All questions are compulsory***
2) ***Answers to the two sections should be written in seperate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic.***
6) ***Pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) How process model can be developed in frequency domain. **[8]**

b) Derive process model of three tanks in parallel. **[8]**

OR

Q2) What is curve fitting? Why it is needed? Find the coefficients for linear relation Y = MX + C for following data **[16]**

NUMBER OF STUDY HOURS	2	4	6	8	10
NUMBER OF SLEEPING HOURS	10	9	8	7	6

Q3) a) Obtain mathematical representation of two isothermal tanks having constant hold-ups series converting reactant A and B into two product C with reaction rate k and reaction is endothermic. **[9]**

b) Explain Mass, component and energy balance equations. **[9]**

OR

Q4) a) Derive Mathematical model for perfectly mixed cooling jacket. **[9]**

b) Develop a steady state mathematical model for binary distillation column. **[9]**

P.T.O.

Q5) a) Explain offline and online identification of process. **[8]**

b) Explain prediction error methods for identification. **[8]**

OR

Q6) a) Explain eyeball fitting method for identification. **[8]**

b) Explain relationship between time, Laplace and frequency domain. **[8]**

SECTION - II

Q7) a) Determine the stability of a 2 × 2 process with a diagonal feedback controller given as: **[9]**

$$G_m = \begin{bmatrix} 5 & 3 \\ 2 & 4 \end{bmatrix} \text{ and B\_s} = \begin{bmatrix} 4 & 1 \\ -1 & 5 \end{bmatrix}$$

b) Explain relative gain array. **[9]**

OR

Q8) a) Explain Inverse Nyquist Array and it's application in analysis of multivariable system. **[9]**

b) For the system given Find NI for this comment on stability also find proper paring of control and manipulated variables. **[9]**

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10\dfrac{e^{-2s}}{(2s+1)} & 15\dfrac{e^{-s}}{(5s+1)} \\ 6\dfrac{e^{-5s}}{(5s+1)} & \dfrac{e^{-2s}}{(2s+1)} \end{bmatrix} \begin{bmatrix} P \\ Q \end{bmatrix}$$

Q9) a) Explain extremum of objective function. **[8]**

b) Explain optimization component of optimization statement with suitable example. **[8]**

OR

Q10)a) Explain Convex and Concave functions with proper example and it's roll in optimization. **[8]**

b) For the functions given below, analyze the concavity and convexity in each case. **[8]**

i) $f(x_1, x_2) = (x_1 - x_2)^2 + x_2$

ii) $f(x) = x_1^2 + 4x_1x_2 + x_1 + x_2 + 3$

iii) $f(x) = 5x + 3x^2 + 4x^3$

iv) $f(x_1, x_2) = x_1^2 - 2x_1x_2 + 7x_2^2$

Q11)a) Determine the optimum values of *x*l & *x*2 for the function **[8]**

$$y = \frac{x_1^2}{3} + \frac{6}{x_1x_2} + 2x_2$$

and state whether point is minimum or maximum

b) Explain Quasi Newton method for optimization. **[8]**

OR

Q12)a) Explain region elimination method. **[8]**

b) Explain simplex method of optimization. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2953

[Total No. of Pages : 3

[5354]-167

B.E. (Instrumentation and Control)

BUILDING AUTOMATION - II

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain with neat sketch basic Air Conditioning Process. **[8]**

b) Explain which Parameter are controlled in HVAC system. **[8]**

OR

Q2) a) What is Human comfort explain human comfort zone, list different factor affecting to human comfort zone. **[8]**

b) Write a short notes on (Any Four): **[8]**

i) Sensible Cooling
ii) Conduction
iii) Convection
iv) Dry bulb Temperatures
v) Dew Point Temperature

Q3) a) Explain Single duct, variable air volume (VAV) systems with neat sketch. **[10]**

b) Explain fire tube type of boiler with neat sketch. **[8]**

OR

P.T.O.

Q4) a) What is vapour compression cycle; summarize refrigerant state according to location in vapour compression cycle. Explain evaporator used in vapour compression cycle. **[10]**

b) Write a short notes on : **[8]**

i) FCU

ii) Unit Ventilator

Q5) a) Explain DDC Architecture with neat sketch. **[8]**

b) Explain two position control and floating control. **[8]**

OR

Q6) a) Explain Peer-Peer and Polling LAN Controller. **[6]**

b) Explain Third party Interface in DDC System. **[10]**

SECTION - II

Q7) a) What is Motor Control Center? Explain Basic Components of Motor Control Centre with neat sketch. **[10]**

b) Explain MODBUS Protocol with neat sketch. **[8]**

OR

Q8) a) Explain LonTalk communications protocol. **[8]**

b) Explain Dedicated network & shared network used in building automation. **[10]**

Q9) a) Explain the concept of Green Building in detail. **[8]**

b) Explain the term Control Reset in HVAC with neat sketch. **[8]**

OR

Q10)a) List various types of Control Points with an example. **[8]**

b) What do you mean Energy Management system (EMS). Explain benefits of Energy Measurement System. **[8]**

Q11)a) Explain IBMS with neat sketch, list benefits of IBMS. **[10]**

b) Explain any one application of BMS Verticals. **[6]**

OR

Q12)a) Explain in brief Integrated building management system with neat sketch. **[10]**

b) Explain the benefits of energy management system. **[6]**

❖❖❖❖

Total No. of Questions : 12]

SEAT No. :

P2954

[Total No. of Pages : 2

[5354]-168
B.E. (Instrumentation and Control)
INSTRUMENTATION IN AGRICULTURE
(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Explain the necessity of Instrumentation in Agriculture engineering. **[8]**

b) Explain the concept of fine wire thermocouple. **[8]**

OR

Q2) a) Explain the open & close path gas analysers. **[8]**

b) Explain the concept of Mohr's circle of stress. **[8]**

Q3) a) Explain the instrumentation for Dairy plant. **[9]**

b) Explain the flow diagram of Batch process. **[9]**

OR

Q4) a) Explain the flow diagram of juice extraction process. **[9]**

b) Explain the instrumentation for Sugar plant. **[9]**

Q5) a) Explain in short irrigation methods: **[2 × 5 = 10]**

i) Over head

ii) Centre Pivot

b) Explain the design considerations in irrigation channels. **[6]**

OR

P.T.O.

Q6) a) Compare different Irrigation systems. **[8]**

b) Explain soil moisture measurement methods: **[2 × 4 = 8]**

i) Gypsum block soil moisture sensor

ii) Thermal based method

SECTION - II

Q7) a) Explain irrigation control management of up stream & down stream control system. **[8]**

b) Explain the role of SCADA for DAM parameters. **[8]**

OR

Q8) a) Explain instrumentation for green house control. **[6]**

b) Explain the application of PLC in Packing Industry. **[10]**

Q9) a) Explain implementation of hydraulic control circuit use in harvesters cotton pickers. **[8]**

b) Explain implementation of pneumatic control circuit use in harvesters cotton pickers. **[8]**

OR

Q10)a) Explain automation in Farm equipments. **[8]**

b) Explain selection criteria for pump in detail. Explain installation of pump. **[8]**

Q11)Write short notes on:

a) Explain the infrared & UV bio sensor methods in agriculture. **[9]**

b) Agrometrological instrumentation weather stations. **[9]**

OR

Q12)a) Explain what is Leaf area length evaportranspiration? **[9]**

b) Explain Soil water content measurement using TDR. **[9]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2955

[Total No. of Pages : 2

[5354]-169

B.E. (Instrumentation and Control)

MICRO ELECTRO MECHANICAL SYSTEMS (Theory)

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Solve Que.1 or 2, Que. 3 or 4, Que. 5 or 6, Que. 7 or 8, Que. 9 or 10,Que.11 or 12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are important applications of smart materials. **[8]**

b) Explain working of piezoelectric micro pump actuator with neat diagram. **[8]**

OR

Q2) a) What are the advantages of MEMS technology. **[8]**

b) Explain the application and working principle of strain gauges in smart bridge. **[8]**

Q3) a) List out applications of portable blood analyzer. **[8]**

b) Explain in detail any one applications of an electrostatic comb-drive. **[8]**

OR

Q4) a) Explain in detail working of piezoelectric inkjet print head. **[8]**

b) Explain in detail working of a magnetic micro relay. **[8]**

Q5) a) Explain in detail with neat sketch working principle of physical vapor deposition technique. **[9]**

b) Explain in detail with neat sketch working principle of radio frequancy heating technique in surface micromachining. **[9]**

P.T.O.

OR

Q6) a) Explain in detail with neat sketch working principle chemical vapor deposition. **[9]**

b) Explain in detail with neat sketch working principle of lithography. **[9]**

SECTION - II

Q7) a) Explain in detail residual stresses and stress gradients. **[8]**

b) Explain in detail torsion of beams and shear stresses. **[8]**

OR

Q8) a) Explain in detail with neat sketch bimorph Effect. **[8]**

b) Compare between bar and beam. **[8]**

Q9) a) Explain in detail the importance of finite element method. **[8]**

b) Describe in detail the steps involved in solving structural problem using finite element method. **[8]**

OR

Q10)a) What is difference between finite element Method and analytical method. **[8]**

b) How finite element Method used for analysis of a piezoelectric bimorph cantilever Beam. **[8]**

Q11)a) Explain characteristic of NPN transistor with neat diagram. **[9]**

b) Derive bridge balance condition of wheatstone bridge. **[9]**

OR

Q12)a) Draw and Explain op- amp based circuit of adder and substractor? Also Mention its applications. **[9]**

b) What is importance of filter .Compare half wave and full wave rectifier. **[9]**

Total No. of Questions : 12]

SEAT No. :

P2833

[Total No. of Pages : 3

[5354] - 17

B.E. (Civil)

ADVANCED FOUNDATION ENGINEERING

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Figures to the right indicate full marks.***
3) ***Use of electronic calculator is allowed.***
4) ***Assume suitable data, if necessary.***
5) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Discuss in brief different case studies for failure of foundation. **[10]**

b) Explain: **[10]**

i) Seismic Refraction Method.

ii) Electrical Resistivity Method.

OR

Q2) a) Explain the following: **[10]**

i) Significant Depth.

ii) IS code provisions for subsoil exploration.

b) Discuss IRC provisions for number of borings & different guidelines, for depth of exploration. **[10]**

Q3) a) Discuss the steps for 'Hansen's Method' for shallow foundation design, subjected to inclined loads. **[8]**

b) Discuss the utility of various softwares, for Geotechnical design, w.r.t. 'Geo-slope'. **[8]**

OR

P.T.O.

Q4) a) Explain the following with comparison, for Raft Foundation, **[8]**

i) Conventional method.

ii) Soil line method.

b) Explain the consideration in the design of combined footings. **[8]**

Q5) a) Explain the steps for 'Reese & Matlock' method. **[8]**

b) What is 'LLP'? How Es, T & ηz is determined for a LLP. **[8]**

OR

Q6) a) How the Qa is determined, for the pile, under test, in a cyclic pile load test? Explain by drawing a sample graph. **[8]**

b) How is the testing of piles subjected to tensile loads carried out? Explain. **[8]**

Q7) a) Explain the design steps for construction of sand chains. **[8]**

b) Explain the step by step procedure for construction on double under reamed pile foundation with sketches. **[8]**

OR

Q8) a) Explain the methods for determination of LCC of Under reamed pile, for following cases, **[8]**

i) Clayey soil.

ii) Sandy soil.

b) Discuss design aspects of double under reamed pile foundation. **[8]**

Q9) a) Discuss the provisions made as per IRC for Caisson design. **[8]**

b) Explain 'Banerjee' & 'Gangopadhyay' Analysis. **[8]**

OR

Q10) Explain the design provisions for **[16]**

a) Well curb.

b) Cutting edge.

c) Steining thickness.

d) Bottom plug.

Q11) a) Discuss construction of common types of 'cofferdams'. **[8]**

b) What are the measures to be taken to avoid failure of well foundation. **[8]**

OR

Q12) a) Explain the steps for 'Anchor sheet pile design'. **[8]**

b) Describe in detail the design considerations in well design. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2956

[Total No. of Pages : 2

[5354]-170

B.E. (Instrumentation and Control)

DIGITAL IMAGE PROCESSING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from section II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain in detail the hardware used in digital image processing. **[16]**

OR

Q2) Discuss image degitizing components. **[16]**

Q3) Explain the human visual systems. **[16]**

OR

Q4) Explain the basic image transformations with suitable examples. **[16]**

Q5) Obtain the 2D DCT of the following image: **[18]**

10	20	30
40	50	60
70	80	90

OR

Q6) Explain Gabour transform. Discuss its properties and applications. **[18]**

P.T.O.

SECTION - II

Q7) Explain various spatial filters for image enahancement. **[18]**

OR

Q8) Explain image enhancement using Discrete Fourier Transform. **[18]**

Q9) Explain image degradation model. **[16]**

OR

Q10)Explain inverse filtering. **[16]**

Q11)Compare various edge detecting operators. **[16]**

OR

Q12)Discuss edge detection in image with suitable application. **[16]**

Total No. of Questions : 12]

SEAT No. :

P2957

[Total No. of Pages : 3

[5354]-171
B.E. (Computer Engineering)
DESIGN & ANALYSIS OF ALGORITHMS
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt three questions from section -I and three questions from section- II.***
2) ***Answer of section-I and section-II should be written on separate answer sheets.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagram wherever necessary.***
5) ***Make suitable assumptions wherever necessary.***

SECTION - I

Q1) a) Give Greedy Kruskal's minimum spanning tree algorithm. Also explain it with suitable example. **[10]**

b) Write control abstraction for divide and conquer algorithmic strategy. Also write recurrence relation for the same and solve it. **[8]**

OR

Q2) a) Write an algorithm for quick sort. State its time complexity by solving recurrence equation. **[10]**

b) Solve following recurrence: **[8]**

$t(n) - 2\ t(n-1) = 3^n$

Q3) a) Let n = 4 and (k1, k2, k3, k4} = {do, if, int, while}. **[8]**

Let p(1:4) = {3,3, 1, l}

Let q(0:4} = {2,3, 1,1, l}

Compute & construct OBST for above values

b) State multistage graph problem and explain how it can be solved using forward approach. **[8]**

OR

P.T.O.

Q4) a) State and explain the principle of dynamic programming. Name the elements of dynamic programming and give the difference between dynamic programming and Greedy method. **[8]**

b) Define the Travelling Salesperson Problem. Solve the TSP problem using Dynamic programming where the edge lengths are given as: **[8]**

0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

Q5) a) What are implicit and explicit constraints with respect to backtracking? **[8]**

b) Write an algorithm on Hamiltonian cycles using Backtracking Strategy. **[8]**

OR

Q6) a) Write recursive algorithm on Graph Coloring using Backtracking Strategy. Determine the time complexity of the same. **[8]**

b) Write an iterative algorithm to solve n queen's problem using backtracking methods. What is the time complexity of this algorithm? **[8]**

SECTION - II

Q7) a) Prove that vertex cover problem is NP complete. **[10]**

b) Describe with example following class: **[8]**

i) P

ii) NP

OR

Q8) a) Prove that CNF-SAT is polynomially transformable to DHC, hence DHC is NP-complete. **[10]**

b) Explain NP – Hard scheduling problem with example. Also comment on the time complexity. **[8]**

Q9) a) Write an algorithm for Odd-Even merge. Determine its time complexity. **[8]**

b) Explain in detail with example Logarithmic time merging algorithm. **[8]**

OR

Q10)a) Explain All pairs shortest paths. Also give parallel shortest paths algorithm. **[8]**

b) Explain in detail sorting and convex Hull algorithm. **[8]**

Q11)a) Explain Image edge detection algorithm. **[8]**

b) What is meant by heuristic algorithms? Discuss any one heuristic search algorithm. **[8]**

OR

Q12)a) Explain convex hull algorithm. Comment on the time complexity. **[8]**

b) Explain resource allocation algorithm for deadlock avoidance. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2958

[Total No. of Pages : 3

[5354]-172
B.E. (Computer Engineering)
PRINCIPLES OF COMPILER DESIGN
(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Construct LALR parsing table for the following grammar. **[10]**

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow d$

b) With respect to parsing explain the following terminologies **[8]**

i) Ambiguous grammar

ii) Follow rules

iii) precedence and associativity

OR

Q2) a) Explain the following: **[4]**

i) token ii) pattern

iii) lexeme iv) Lexical error

b) Describe in detail about input buffering. **[6]**

c) Design SLR parsing table for following grammar **[8]**

$S \rightarrow aABe$

$A \rightarrow Abc$

$A \rightarrow b$

$B \rightarrow d$

Q3) a) Write a syntax directed definition for constructing syntax tree for expressions. Give example of it. **[8]**

b) What is need of Semantic Analysis? Explain the position of Type Checker with diagram. **[8]**

P.T.O.

OR

Q4) a) Write short notes on: **[8]**

i) Translation schemes

ii) Type system and Type expressions

b) What is mean by 'syntax directed definitions' ? Give syntax directed definition for any example arithmetic expression. **[8]**

Q5) a) How would you generate intermediate code for the flow of control statements? Explain with examples. **[8]**

b) Translate the exp – (a+b)*(c+d)+(a+b+c) into **[8]**

i) Quadruple

ii) Triples

iii) Indirect triples

OR

Q6) a) Generate three address code for the following code fragment **[8]**

```
if(a<b)
        while (c > d)
            x = x + y;
    else
        do
            p = p + q;
        while (e < = f);
```

b) Explain in detail the translation of assignment statements. **[8]**

SECTION - II

Q7) a) Mention the different types of parameter passing. **[8]**

b) When does a dangling reference occur? Give its impact on programs. **[8]**

OR

Q8) a) What are symbol tables? Explain in brief the different ways of organizing the symbol table. **[8]**

b) What do you mean by activation record? With a neat sketch, describe the activation record used by C compiler? **[8]**

Q9) a) What do you meant by 'Next-Use' information ? How it is computed? **[8]**

b) Explain Code generation algorithm in detail from labeled tree. **[8]**

OR

Q10)a) Describe in detail about a simple code generator with the appropriate algorithm **[8]**

b) Discuss various issues in code generation phase. **[8]**

Q11)a) Write an algorithm for copy propogation. **[8]**

b) Write a short note on data flow analysis. **[10]**

OR

Q12)a) What do you mean by a common sub-expression? Discuss the algorithm for elimination of common sub-expression. **[10]**

b) Specify the necessary and sufficient conditions for performing **[8]**

i) Constant propogation

ii) Loop optimization

Total No. of Questions : 12]

SEAT No. :

P2959

[Total No. of Pages : 3

[5354]-173

B.E. (Computer Engineering) (Semester - I)

OBJECT ORIENTED MODELING AND DESIGN

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from section I and three questions from section II***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) Explain common Mechanism in UML **[8]**

b) Explain in brief **[8]**

i) RUP

ii) XMI

OR

Q2) a) What is OCL. With the help of OCL expressions, how the constraints can be specified in UML. **[8]**

b) Explain different relationships in use case diagram. Explain extends and include stereotype with proper example. **[8]**

Q3) a) Draw and Explain looping and streaming in activity diagram. **[8]**

b) Draw the Use Case Diagram for the Credit card processing. The merchant submits a credit card transaction request to the credit card payment gateway on behalf of a customer. Bank which issued customers credit card would approve or reject the transaction. If transaction is approved, funds will be transferred to merchants bank account. Identify the actors. use cases and use full advance notation to draw the diagram. **[8]**

OR

Q4) a) What are different Activity nodes used in activity diagram Draw and Explain with example? **[8]**

b) Explain main flow and alternate flow with reference to use case diagram **[8]**

P.T.O.

Q5) a) Explain the following terms with respect to association relationship: **[6]**

i) Association class

ii) Association qualifiers

iii) Navigability

b) Draw a class diagram for DVD SHOPEE system. Make suitable assumptions about scope and working of your shop (write down the scope too). The shop sells audio and MP3,CDs,DVDs. The search can be made on various aspects like singer, music director etc. The buying transaction is recorded. The payment is accepted in cash against the bill. Your class diagram must show relevant attributes, methods ,relationships **[8]**

c) What are templates? How are they represented in UML **[4]**

OR

Q6) a) Explain connectors, ports and pins with reference to composite structure diagrams **[6]**

b) Explain Import, Access and Merge in the Package Diagram for ATM System. **[6]**

c) Give the elements and application of an object diagram with an example. **[6]**

SECTION - II

Q7) a) What are different types of messages in sequence diagram ? Explain each with appropriate example. **[8]**

b) what is the significance of communication diagram. Draw communication diagram for online shopping web application. **[6]**

c) Briefly explain the use of interaction overview diagram. **[4]**

OR

Q8) a) Explain the significance of timing diagram with proper example **[6]**

b) Draw a state machine diagram for Bank Automated Teller Machine (ATM). ATM is initially off. After the power is turned on, ATM performs startup action and enters Self Test state. If the test fails, ATM goes into Out of Service state, triggerless transition and Idle state. The ATM state changes from Idle to Serving Customer when the customer inserts banking or credit card in the ATM's card reader. On entering the Serving Customer state, the entry action readCard is performed. It goes back to the Idle or in cancel state as the customer could cancel transaction at any time. Draw advanced state machine diagram with full notations. **[8]**

c) Explain Alternatives and option interaction operator in sequence diagram **[4]**

Q9) a) Draw the white box view of component Diagram for online shopping. The system contain three related subsystems - WebStore, Warehouses, and Accounting. WebStore subsystem contains three components related to online shopping - Search Engine. Shopping Cart, and Authentication. Accounting subsystem provides two interfaces - Manage Orders and Manage Customers. Warehouses subsystem provides two interfaces Search Inventory and Manage Inventory used by other subsystems. With proper interfaces and notations draw a complete component diagram. **[8]**

b) Explain Artifact, instances and execution environments in Deployment diagram **[8]**

OR

Q10)a) Draw UML deployment diagram for J2EE web application with load balancing and clustering which shows specific server instances involved. Incoming HTTP requests are first processed by Apache web server. Static content such as HTML pages. images, CSS. and JavaScript is served by the web server. Requests to JSP pages are load balanced and forwarded to 2x2 Apache Tomcat servers using both vertical and horizontal clustering. **[8]**

b) Enlist and explain different stereotypes used component Diagram with an example. **[8]**

Q11)a) Explain the proxy design pattern with its type **[8]**

b) Give the solution for observer design pattern. **[8]**

OR

Q12)a) Explain the façade design pattern with an example? **[8]**

b) How do you reverse engineer a class diagram ? Explain with inheritance example **[8]**

Total No. of Questions : 12]

SEAT No. :

P2960

[Total No. of Pages : 3

[5354]-174
B.E. (Computer Engg.)
Image Processing
(Elective-I) (2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 question from each section.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With a neat block diagram, describe various components used in general purpose image processing system. **[8]**

b) Explain any two applications of image processing **[8]**

OR

Q2) a) Explain image acquisition using sensor strips and sensor arrays **[8]**

b) What is digital image processing? Explain sampling and quantization **[8]**

Q3) a) What are the advantages of image sharpening? Explain a sharping technique. **[8]**

b) What is need of image preprocessing? Explain Log transformation and Power-Law transformation **[8]**

OR

Q4) a) Write the expression for two dimensional Walsh transform pair and explain it. **[8]**

b) Write the question for converting colors from RGB to HCI **[8]**

P.T.O.

Q5) a) What is the principle of region growing based image segmentation? **[10]**

b) Explain chain codes and B-Splines for boundary representation. **[8]**

OR

Q6) a) List out the advantages, disadvantages, and applications of the following (any two) : **[10]**

1) Radon Transform

2) Gabor Transform

3) STFT

b) What is region splitting and merging? **[8]**

SECTION - II

Q7) a) What do you mean by Image denoising? Explain different noise model in image? **[10]**

b) Explain the wiener filtering approach for image restoration. **[8]**

OR

Q8) a) Write short note on **[10]**

1) Lucy richardson Filtering

2) Blind Deconvolution

b) Explain in detail Homomorphic Filtering **[8]**

Q9) a) Write short note on vector quantization **[8]**

b) Explain the methods used for lossless image compression **[8]**

OR

Q10)a) What are the advantages of variable-length coding? Find the Huffman code for following symbols. **[8]**

Source	a1	a2	a3	a4	a5	a6
Probability	0.3	0.5	0.02	0.03	0.3	0.1

b) Why we need to identify the boundary? Explain the simple method for it? **[8]**

Q11)a) Write short note **[10]**

i) Principal Component Analysis

ii) Character Recognition Application

b) Write a short note on Canny edge detection algorithm **[6]**

OR

Q12)a) What are the different image compression methods? Explain any one of it. **[6]**

b) Write short note on application of **[10]**

1) Medical Image Processing.

2) Haar Wavelets.

Total No. of Questions : 12]

SEAT No. :

P2961

[Total No. of Pages : 3

[5354]-175

B.E. (Computer Engineering)

DESIGN AND ANALYSIS OF COMPUTER NETWORKS

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of logarithmic tables slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the characteristics of queuing system and the six parameters associated with Kendall Notations. **[8]**

b) Messages (independently) arrive to a system at the rate of 10 per minute. Their lengths are exponentially distributed with an average of 3600 characters. They are transmitted on a 9600 bps channel. A character is 8 bits long. **[10]**

i) What is the average service time?

ii) What is the arrival rate?

iii) What is the service rate?

iv) What is the utilization of the server?

OR

Q2) a) Explain significance and importance of Little's theorem in queuing theory. **[8]**

b) Customers arrive at a watch repair shop according to a Poisson process at a rate of one per every 10 minutes, and the service time is an exponential r.v. with mean 8 minutes. **[10]**

i) Find the average number of customers L, the average time a customer spends in the shop W, and the average time a customer spends in waiting for service Ws.

ii) Suppose that the arrival rate of the customers increases 10 percent. Find the corresponding changes in L, W, and Ws.

P.T.O.

Q3) a) Describe in brief various system design techniques available. Give the advantages of pipelining technique over randomization technique of system design. **[8]**

b) Compare merits and demerits of first, second and third generation switches. **[8]**

OR

Q4) a) Explain the importance of performance metrics and systems constraints in network design. What are the common resources need to be considered while designing the networks. **[8]**

b) Explain the functioning of crossbar switch. **[8]**

Q5) a) What is scheduling? Describe the best effort and guaranteed service connections scheduling. **[8]**

b) Explain TCP flow control schemes in brief. **[8]**

OR

Q6) a) Compare First-Come-First-Served (FCFS) and Weighted fair queuing (WFQ) scheduling disciplines along with its pros and cons. **[8]**

b) Consider ATM virtual circuits A and B with arrival rates 10 and 20 Mbps that share an OC3 link. Suppose that with FCFS, both their mean queuing delays are 0.5ms and that with a new discipline, A's mean delay is reduced to 0.1 ms. What is B's new mean queuing delay? **[8]**

SECTION - II

Q7) a) Describe the functioning of RSVP protocol in relation to traffic management. **[8]**

b) Explain the Quality-of-Service (QoS) parameters used in ATM Forum and IETF approaches. **[10]**

OR

Q8) a) What is admission control strategy? Explain any one admission control strategy. **[8]**

b) What is Signaling? Which are the types of signaling? Explain Signaling System No. 7 in telephone networks. **[10]**

Q9) a) What is routing? Explain the functions and responsibilities of a router. **[8]**

b) Describe various performance metrics typically used in enterprise networks. **[8]**

OR

Q10)a) Explain the architecture of router along with the fields in the routing table. **[8]**

b) Explain the Random Early Detection packet scheduling algorithm. **[8]**

Q11)a) Consider a company with 500 PC nodes; company is interested to provide a concurrent Internet facility to all the nodes, design and draw the network with suitable components considering scalability and security aspects. **[8]**

b) Explain any five network management related tools/commands used by the Network Administrator. **[8]**

OR

Q12)a) Identify the typical security issues in an enterprise network and explain how you will resolve these issues. **[8]**

b) An organization uses a class C network decided to subnet into four different subnets calculate the appropriate subnet mask for the same. How many hosts will be supported in each subnet? **[8]**

Total No. of Questions : 12]

SEAT No. :

P2962

[Total No. of Pages : 3

[5354]-176
B.E. (Computer)
ARTIFICIAL INTELLIGENCE
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from section - I and 3 questions from section - II.***
2) ***Neat diagrams should be drawn wherever necessary.***
3) ***Assume suitable data wherever necessary.***

SECTION - I

Q1) a) What are intelligent agents? Explain the architecture of a typical agent. **[8]**

b) What is the role of table driven agent program in simple reflex agent? Explain the functions of model based reflex agents. **[8]**

OR

Q2) a) Explain in detail what is meant by task environment. Illustrate with example. **[8]**

b) Define the term Artificial Intelligence? Explain two applications of AI. **[8]**

Q3) a) What is hill climbing? Explain Plateau, ridge, local maxima and global maxima. **[10]**

b) Write short notes on "heuristic search". **[8]**

OR

Q4) a) Explain A * Algorithm with suitable example. How is it possible to avoid loops in A*. **[10]**

b) What is Means ends analysis. Explain with example. **[8]**

P.T.O.

Q5) a) Explain alpha beta cut off with an example. Assume a sample game tree for explanation. **[8]**

b) Explain Constraint satisfaction problem with example. **[8]**

OR

Q6) Write short notes on **[16]**

a) backtracking for CSP

b) Evaluation functions for games

c) Local search for CSP

d) Partially observable games

SECTION - II

Q7) a) Explain goal stack planning with an example of blocks world. **[8]**

b) Explain how planning problem is expressed in STRIPS. **[10]**

OR

Q8) a) Comment on Non linear planning and hierarchical planning. **[8]**

b) State the rules for converting the well formed formula to clause form with example. **[10]**

Q9) a) Describe any two learning methods. **[8]**

b) Explain fuzzy set and crisp set. Mention applications of fuzzy logic. **[8]**

OR

Q10)a) What are the basic axioms of probability? Why are they reasonable. **[8]**

b) Define the Bayes rule and explain its use with example. **[8]**

Q11)a) Give detailed architecture of expert system and explain its components. **[8]**

b) Explain the various phases of NLP with an example. **[8]**

OR

Q12)a) What is the difference between expert systems and traditional system? Comment on advantages and disadvantages of expert systems. **[8]**

b) Write short notes on Parsing. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2963

[Total No. of Pages : 3

[5354]-177
B.E. (Computer Engg.)
SOFTWARE ARCHITECTURE
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Answers to the two sections should be written in separate answer books.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Explain architecture business cycle. **[6]**

b) Write short notes on architecture structures and views **[12]**

OR

Q2) a) Write short note on software architecture structures. **[8]**

b) Write short note on software design and its impact on application. **[10]**

Q3) a) List out some common user friendly features seen in email applications. **[8]**

b) Draw a diagram for modifiability tactics and discuss the same. **[8]**

OR

Q4) a) Explain software quality attributes & quality attribute scenarios **[8]**

b) Explain with example performance, response time and throughput. **[8]**

P.T.O.

Q5) a) Draw a class diagram for observer pattern and explain it. **[8]**

b) Write short note on MVC pattern. **[8]**

OR

Q6) a) What are the various types of proxy patterns? **[8]**

b) Explain design patterns and architectural patterns. **[8]**

SECTION - II

Q7) a) Compare the java world and Microsoft world for their offerings .NET and J2EE. **[8]**

b) What kind of application can be developed in RPC and how RPC is of benefit for such application? **[8]**

OR

Q8) a) Write short not on EJB components. **[8]**

b) What is the need of J2ME and Java APIs? **[8]**

Q9) In brief explain the concept and give good examples to illustrate. **[18]**

a) Web application.

b) Plug-ins and browser configuration

c) Client side validation

d) Need for HTML 5

OR

Q10) Explain following concepts through simple examples. **[18]**

a) JSP tags

b) Servlets

c) XHTML

d) Java applets

Q11) a) Write short note on Distributed COM. **[8]**

b) List and explain advantages of java and struts. **[8]**

OR

Q12) a) Explain concept of ACTIONS. **[8]**

b) Write short note advantages of STRUTS. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2964

[Total No. of Pages : 3

[5354]-178

B.E. (Computer Engg.)

MULTIMEDIA SYSTEMS (Elective - II)

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section - I & Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section - II.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) What is multimedia? Explain building blocks of multimedia. **[8]**

b) Explain in brief how the operating system supports development of multimedia applications. **[8]**

OR

Q2) a) What is MMDBMS? Explain the characteristics of Multimedia database. **[8]**

b) Describe in brief Multimedia file system with reference to conventional file system. **[8]**

Q3) a) What is image enhancement? Explain different point processing techniques for enhancement of an Image. **[8]**

b) Explain Shannon-Fano compression algorithm by taking a suitable example. **[8]**

P.T.O.

OR

Q4) a) Draw BMP file format. **[6]**

b) Write short note on JPEG image compression suite. **[10]**

Q5) a) State different compression techniques of an audio. Explain PCM & DPCM in brief. **[8]**

b) Explain WAV and VOC audio file formats. **[10]**

OR

Q6) a) Explain how audio is captured and stored in computers? **[8]**

b) Explain the MIDI file format in detail. **[10]**

SECTION - II

Q7 a) State lossless Text Compression techniques. Explain LZW compression with suitable example. **[10]**

b) Which are the different video broadcasting techniques? Compare them. **[6]**

OR

Q8) a) Explain different video frames with reference to MPEG. **[8]**

b) Compare H.261 and H.263 video file formats. **[8]**

Q9) a) State and explain principles of 2D animation. **[10]**

b) Explain the architecture of OpenGL. **[8]**

OR

Q10) a) State and explain essential GLUT functions of OpenGL. **[10]**

b) Explain the use of animation in website development. **[8]**

Q1) a) Explain Media on Demand Concept in Multimedia. **[8]**

b) Explain how multimedia is useful in e-learning and education. **[8]**

OR

Q12) Write short notes on following - **[16]**

a) Multimedia over IP.

b) Quality of Service in Multimedia data transmission.

c) Applications of Multimedia in Entertainment.

Total No. of Questions : 12]

SEAT No. :

P2965

[Total No. of Pages : 3

[5354]-179
B.E. (Computer Engineering)
MOBILE COMPUTING
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer questions 1 or 2, 3 or 4, and 5 or 6 from section - I and questions 7 or 8, 9 or 10, and 11 or 12 from section - II***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain in detail GSM architecture system with diagram **[10]**

b) Define the following terms: **[8]**

i) Teleservices,

ii) Bearer services, and

iii) Supplementary services.

OR

Q2) a) Explain in detail GSM network structure. **[10]**

b) List, in order of importance, the operational requirements of GSM. **[8]**

Q3) a) What are the bursts signals used in GSM **[8]**

b) List the messages (information) transmitted over BCCH, FCCH, and SCH. Justify why hopping cannot be used for these channels. [8]

OR

Q4) a) What do you mean by the rates of frame, multiframe, and the superframe? **[8]**

b) Explain frequency hopping in detail. What is slow frequency hopping (SFH) and fast frequency hopping (FFH)? [8]

P.T.O.

Q5) a) Why it is necessary for the mobile to register in the system? Can one classify registration as a special case of location update? **[8]**

b) Explain the concept of "Off-Air Call Setup." What are the advantages of this scheme? **[8]**

OR

Q6) a) Define functions performed within the following procedures: **[8]**

i) Identification

ii) Encryption and ciphering

iii) Call clearing

iv) IMSI attach and detach

v) Location update

b) Why is initialization necessary for mobile after the power is turned on? **[8]**

SECTION - II

Q7) a) Explain four different types of security services provided by GSM. **[8]**

b) Why do you think the ciphering key Kc must differ from one call to another? **[8]**

OR

Q8) a) For what reasons is the PIN number used? What is its main purpose? **[8]**

b) Explain generic authentication process with the help of diagram. **[8]**

Q9 a) Narrate all reasons of handoff. Define the term "Directed handoff." **[8]**

b) Compare spectrum efficiency of CDMA with TDMA **[8]**

OR

Q10)a) Name the three classes of handover. What are the two modes of handover? **[8]**

b) Explain both the spread spectrum technologies. **[8]**

Q11)a) Explain MAP protocol for mobility management with neat diagram. **[8]**

b) Enumerate the basic functions of MM, CC, and RR layers. Illustrate with some examples. **[10]**

OR

Q12)a) What is the difference between connectionless and connection oriented signaling? **[8]**

b) Show the complete message coding for: call confirmed, call proceeding, location updating request, channel release, immediate assignment, and partial release. [10]

⊖⊖⊖

Total No. of Questions : 6]

SEAT No. :

P2899

[Total No. of Pages :3

[5354]-18

B.E. (Civil)

ADVANCED ENGINEERING GEOLOGY WITH ROCK MECHANICS

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Discuss in brief

a) Pinching and bulging of dykes. **[4]**

b) Regional Distribution of Deccan Traps. **[5]**

c) Engineering significance of Older Secondary rocks occurring in Maharashtra. **[9]**

OR

Write notes on the following:

a) Field Characters of Fractures. **[4]**

b) Criteria for demarcation of flows in DTB. **[5]**

c) Engineering significance of Older Metamorphic rocks occurring in Maharashtra. **[9]**

Q2) a) Engineering significance of dykes from dam foundation point of view. Discuss case history. **[7]**

b) Discuss in detail the geological conditions leading for the failure of tail channel in Deccan traps. Conclude case histories due to **[9]**

i) Columnar Basalt.

ii) Volcanic Breccia.

P.T.O.

OR

a) Discuss in detail the origin of Tachylytic basalts and their engineering properties. **[7]**

b) Discuss how location of spillway is decided on geological grounds. Add a note of case studies due to Dykes and Joints. **[9]**

Q3) a) Define Rock Mechanics. Write only physical properties of rock masses. **[8]**

b) Explain in detail Bieniawski's Geomechanical Classification. **[8]**

OR

a) Discuss about RSR **[4]**

b) General RMR Value of Compact Basalt **[6]**

c) Write a note of Electrical Resistivity Method. **[6]**

SECTION - II

Q4) a) What should be minimum depth of drilling for bridge foundation investigations? **[6]**

b) What precautions will have to be taken while tunneling through volcanic breccias and amygdaloidal basalt? Give case histories. **[12]**

OR

a) Explain importance of subsurface investigations for foundation of bridges. **[6]**

b) What are fractures? Discuss their engineering significance from tunneling point of view with case histories. **[12]**

Q5) Write Notes on the following:

a) Characters and engineering significance of older alluvium. **[6]**

b) Influence of climate on soil formation. **[6]**

c) Granular disintegration. **[4]**

OR

Give detailed account of water bearing characters of Deccan trap rocks. **[16]**

Q6) a) Availability of natural sand as construction material in Deccan Trap area. **[8]**

b) Will dam building activity cause a major earthquake. **[8]**

OR

a) Problems with 'open excavations' in city areas. **[8]**

b) Fault zone treatment **[4]**

c) Foundation of monumental buildings **[4]**

Total No. of Questions : 12]

SEAT No. :

P2966

[Total No. of Pages : 3

[5354]-180
B.E. (Computer Engineering)
EMBEDDED SYSTEMS
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Question No. 1 or 2, 3 or 4. and 5 or 6 from Section - I and Q. No. 7 or 8, 9 or 10 and 11 or 12 from Section - II.***
2) ***Answers to the two Sections must be written in separate answer books.***
3) ***Neat diagram must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Which characteristics of an Embedded system make it different than a General Purpose system? **[8]**

b) Discuss various application areas of embedded system. **[4]**

c) Draw layered architecture of Embedded system. Discuss various components in the Embedded System. **[6]**

OR

Q2) a) Differentiate between RISC and CISC architecture of the processors used in embedded systems. **[6]**

b) What challenges are faced while designing an embedded system. **[6]**

c) Explain how embedded processor and Application Specific System Processors are different than a general processor? **[6]**

Q3) a) Discuss various actions taken to reduce the power consumption in an embedded system. **[8]**

b) Discuss different structural units in a processor in an embedded system. Mention few advanced units. **[8]**

P.T.O.

OR

Q4) a) Discuss various read only memories used in an embedded system? **[4]**

b) Describe different operating modes of ARM7 processor. **[6]**

c) It is required to design a real time robotic control system. For this application, select the appropriate processor based on **[6]**

i) Instruction cycle time

ii) Bus width

iii) MIPS

iv) On chip cache

v) On chip RAM/ROM

Q5) a) Differentiate between parallel and serial ports in a system. **[4]**

b) Discuss 12C protocol w.r.t. following points **[8]**

i) Data transfer speed

ii) Arbitration

iii) Data frame format

c) Discuss optical devices commonly used in embedded systems along with applications? **[4]**

OR

Q6) a) Discuss different fields in the data frame of CAN bus protocol. What are the applications of CAN? **[8]**

b) Discuss the topology used by devices to communicate through USB protocol. Mention different types of data transfer. **[8]**

SECTION - II

Q7) a) What are the advantages and disadvantages of programming in C++ for Embedded system? **[8]**

b) What is the use of an emulator in embedded system design? Explain with the help of diagram. **[10]**

OR

Q8) a) With the help of neat diagram, explain software development cycle for embedded system. **[8]**

b) Explain the usage of stacks and queues in embedded system programming. **[10]**

Q9 a) What are the subsystems of an I/O system? Explain. **[8]**

b) How RTOS performs the schedule management of multiple tasks. **[8]**

OR

Q10)a) Discuss different ways in which interrupts are handled in RTOS environment. **[6]**

b) What are virtual device drivers? Explain. **[6]**

c) Compare assembly language programming and high level language programming. **[4]**

Q11)a) Write short note on any two **[8]**

i) Embedded Linux

ii) VxWorks

iii) Special OS features for automotive systems

b) Differentiate between soft real time operating system and hard real time operating system. **[4]**

c) Identify the requirements of s/w mobile phone and show it with the help of class diagram. **[4]**

OR

Q12)a) Discuss different features of µCOS-II. **[4]**

b) Differentiate between RTOS and Desktop OS based on the following points **[4]**

i) Interrupt handling

ii) Task scheduling

c) Explain digital camera with respect to hardware and software components.**[8]**

Total No. of Questions : 12]

SEAT No. :

P2967

[Total No. of Pages : 3

[5354]-181

B.E. (Computer Engineering) (Elective - II)

SOFTWARE TESTING & QUALITY ASSURANCE

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain any four Testing Principles with examples. **[8]**

b) Explain Defect cycle and Defect report. **[8]**

OR.

Q2) a) Explain Testing life cycle and Phases of Testing. **[8]**

b) Write a short note on Software Testing. Goal of Software Tester, Defect Report, and Importance of Testing in Software Production Cycle. **[8]**

Q3) a) What is a Black Box testing and explain any four Black Box testing techniques with examples. **[10]**

b) What is a Test case and mention a test case format assuming one example. Please mention atleast six points in the Test Case format. **[8]**

OR

Q4) a) Consider an Employee Attendance System. This system keeps record of Employees' attendance. This is an Online Web based system and whenever an Employee enters in the Company then he/she logins into the web based system with user credentials (login name and password). The web System Captures login time of the employee. When Employees are leaving from the office and at the end of the day, they logout on the web application and application captures log out time. The web application calculates the total time spent by the Employee in the company. If the total time in a day is more than 8 hours then Application marks attendance as Present else marks it Absent

i) Write a Test Plan (IEEE format)

ii) Identify and write one Test cases each for Boundary Value Analysis and Equivalance Partitioning. **[12]**

P.T.O.

b) Write a short note on Documentation testing. **[3]**

c) What is Domain Testing? **[3]**

Q5) a) What is the Need of White Box testing? Explain with one example. **[8]**

b) Write short notes on Loop Testing and Basis Path testing. **[8]**

OR

Q6) a) Consider a hypothetical situation where a Customer's requirement is to create a website where users can come and shop electronic items from the website. The software company have started writing codes and ready for the testing of the code. Assume you are from a Test Team and your Manager has asked you to perform the White Box testing.

i) Mention 2 testing technique that you will use for doing White Box testing and how it will be done.

ii) Write one Test case each for above Testing Technique (in Test Case Format)

iii) Assume Customer has asked you to perform Mutation Testing. Explain how would you perform Mutation Testing and Formula to find Adequacy of Test Set? **[10]**

b) Explain different types of Code Coverage Testing. **[6]**

SECTION - II

Q7) a) What is Validation Testing Technique? Explain with one example. **[4]**

b) What is the difference between Regression Testing and Sanity Testing? **[6]**

c) Write a short note smoke testing Random Testing and GUI testing. **[6]**

OR

Q8) a) Explain structure of Test Organization. Write a short note on Measurement tools. **[8]**

b) Write short on: **[8]**

i) Project Metric

ii) Progress metric

Q9) a) What is Software Quality and explain how Cost of Quality increases with phases of SDLC (Software Development Life Cycle)? Explain with example. **[9]**

b) What is the difference between Software Quality Assurance and Software Quality Control? Explain with examples. **[8]**

OR

Q10) a) What is Six Sigma? Explain DMAIC with reference to Six Sigma. **[9]**

b) Explain McCall's Quality Factors in details. **[8]**

Q11)a) Consider a Web based online Cab booking system, where a customer can come and book a Car for local and outside Travel needs. Assume you have to Perform both Manual and Automated Testing for this Web based application.

i) Explain how Manual Testing will be performed with one Test Case as an example.

ii) Explain how Automated Testing will be performed with one Test case as an example.

iii) Mention four different types of Automated Testing Tools in the market and explain features of one of them. **[10]**

b) Compare Manual Testing and Automated Testing, also discuss the problems handled by automation. **[7]**

OR

Q12)a) Write detail note on Design and Architecture for Automation with diagram. **[7]**

b) Write short note on **[10]**

i) QTP

ii) Winrunner

Total No. of Questions : 12]

SEAT No. :

P2968

[Total No. of Pages : 3

[5354]-182

B.E. (Computer Engineering)

DISTRIBUTED OPERATING SYSTEM

(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Multicomputers operating system, network operating system and distributed operating system. **[6]**

b) What is Distributed System? Describe Evolution of Distributed Computing System. **[10]**

OR

Q2) a) What is Distributing Operating System? Explain features of Distributing Operating System in detail. **[6]**

b) Write a note on CORBA. What is Remote Method Invocation? Explain modules in RMI? **[10]**

Q3) a) Write short note on Middleware Communication Networks. **[6]**

b) Why Lamport logic clock is required? What are the conditions satisfied by logical clocks? Discuss the limitation of Lamport's clock how do overcome those. **[10]**

OR

P.T.O.

Q4) a) Discuss Inherent Limitations of a Distributed System. **[6]**

b) Why election algorithm is required in distributed operation system? Explain it with any one election algorithm. **[10]**

Q5) a) What are mutual exclusion algorithms? Classify them. **[8]**

b) What are the different issues in deadlock detection and resolution? Explain Suzuki Kasami's broadcast algorithm. **[10]**

OR

Q6) a) Show that Byzantine agreement cannot always be reached among four processor if two processor are faulty. **[8]**

b) Explain Ricart Agrawala algorithm. **[10]**

SECTION - II

Q7) a) Write a short note on Distributed File System. **[8]**

b) Discuss distributed shared memory system with architecture. What is Memory Coherence? **[8]**

OR

Q8) a) Explain Components of load distributing algorithms. **[8]**

b) How to select a suitable load sharing algorithm? What are the Requirements for load distributing? **[8]**

Q9) a) Discuss the types of failures in distributed systems. **[8]**

b) What is Rollback? How does it help in recovery mechanism? Explain in details the rollback recovery algorithm **[8]**

OR

Q10)a) Write note on: **[8]**

i) Recovery in concurrent system.

ii) Synchronous and Asynchronous check pointing and recovery

b) Explain access matrix model for security. **[8]**

Q11)a) How Grid Computing works? **[8]**

b) What are web services? How do you compare it to components? And then Compare between service oriented architecture and component based architecture. **[10]**

OR

Q12)a) Explain the relation of the following system with distribution system. **[8]**

i) Cluster computing

ii) Cloud computing

iii) Service oriented architecture

b) Explain Service oriented architecture. **[10]**

❖❖❖❖

Total No. of Questions : 12]

SEAT No. : ____

P2969

[Total No. of Pages : 3

[5354]-183
B.E.
COMPUTER
Advanced Computer Architecture & Computing
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from section - I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from section - II.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Assume Suitable data if necessary***

SECTION - I

Q1) a) Explain in brief Flynn's and Feng's Classification for parallel computer architecture. **[8]**

b) Discuss different Hazards in pipeline processor and their resolution. **[10]**

OR

Q2) a) Discuss the following different pipeline and advanced pipeline technique **[8]**

i) Register tagging.
ii) Internal forwarding.

b) State and explain the principle of scalability and different performance Metrics associated with it . Explain in brief Amdahl's law for speed up performance. **[10]**

Q3) a) What are the various features of uniprocessor system which exploits the parallelism. **[8]**

b) What is job sequencing problem with pipeling architecture? Define following terms: **[8]**

i) Forbidden list
ii) Collision vector
iii) Simple cycle
iv) Greedy cycle
v) MAL
vi) Throughput

P.T.O.

OR

Q4) a) Explain design issues of instruction and arithmetic pipeline. **[8]**

b) Discuss the vector instruction set and differenciate between vectoe and Superscalar architecture. **[8]**

Q5) a) How a 3-cube network can viewed as .Discuss in detail the parallel algorithm for matrix multiplication. Obtain the time complexity for the same. **[8]**

b) Discuss vector optimizing techniques implemented in vectorizing compiler. **[8]**

OR

Q6) a) Considering Mesh network as an interconnection network for array processors. Discuss in detail the parallel algorithm for sorting the array of elements. **[8]**

b) With suitable example explain following features implemented in cray-1 architecture. **[8]**

i) Vector chaining

ii) Strip Mining

SECTION - II

Q7) a) Discuss Dynamic bus arbitration techniques associated with time shared bus. **[10]**

b) Compare between : **[8]**

i) Write - Through and Write - Back caches

ii) Write - Update and write - Invalidate protocol.

OR

Q8) a) What is the difference between static and dynamic bus arbitration techniques. Explain any two dynamic bus arbitrations techniques. **[8]**

b) With the help of few machine instructions explain the hardware support provided for inter process synchronization. **[6]**

c) Discuss about loosely coupled multiprocessor system. **[4]**

Q9) a) State cache multi coherency problem in multiprocessor system. Describe the various state of MESI protocol. **[8]**

b) Compare cross bar switch with multiported memory module interconnection network. **[8]**

OR

Q10)a) Discuss the various context switching policies implemented in multithreaded architecture. **[8]**

b) Explain with suitable example message passing parallel programming. **[8]**

Q11)a) Define the term-memory consistency model. What different types of memory consistency models are available for multithreaded architectures? Discuss various parameters affecting performance of multithreaded architecture. **[8]**

b) Explain with suitable examples shared memory parallel programming. **[8]**

OR

Q12)a) Explain the various steps to be followed to develop parallel algorithms for multiprocessors. **[8]**

b) Compare PVM and MPI message passing libraries. Explain briefly various communication functions implemented as a part of MPI. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2970

[Total No. of Pages : 2

[5354]-185

B.E. (Computer Engineering)

HIGH PERFORMANCE NETWORKS

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from section II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Discuss in short about 1000 BASE-X family with suitable applications. **[8]**

b) Explain high level system architecture of Gigabit. **[10]**

OR

Q2) a) Explain in short the need of flow control in gigabit Ethernet? How it is supported? **[8]**

b) Differentiate between 10, 100, 1000 Mbps n/w based on their MAC characteristics. **[10]**

Q3) a) Explain physical configurations for ISDN User-Network Interfaces with examples. **[8]**

b) Explain in brief elementary functions for ISDN. **[8]**

OR

Q4) a) Describe the SS7 protocol architecture. **[8]**

b) Explain Frame-Mode Control Signaling with example. **[8]**

P.T.O.

Q5) a) Explain in short the functional architecture of B-ISDN. **[8]**

b) What is Quality of Service? Explain in detail the various ATM QoS parameters specifying their category of assessment. **[8]**

OR

Q6) a) Explain in details the ATM adaptation layer. **[8]**

b) What are the different ATM Service Categories? Explain in details. **[8]**

SECTION - II

Q7) a) Draw and explain a typical ADSL equipment configuration. **[8]**

b) Draw and explain the general block diagram of DMT Transmitter. **[8]**

OR

Q8) a) Explain architecture of VDSL. **[8]**

b) Explain in short why are some variations of xDSL asymmetric? **[8]**

Q9) a) Explain step-by-step MPLS operations that can occur on data packets in an MPLS domain. **[8]**

b) Explain working of RSVP. **[8]**

OR

Q10)a) Describe the following terms related to MPLS operation **[8]**

i) LER ii) LSR

iii) LDP iv) LSP

b) Explain tunneling in MPLS. **[8]**

Q11)a) What is Wi-Fi? Explain with configuration steps. **[10]**

b) What is WiMax? Explain in details. **[8]**

OR

Q12)a) Comment on any 3 WiMax QoS classes along with suitable Application support. **[8]**

b) Explain the following terms related to WiMax **[10]**

i) Fixed wireless access

ii) Nomadic wireless access

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2971

[Total No. of Pages : 3

[5354]-186

B.E. (Computer)

NEURAL NETWORKS

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) What do you mean by Neural Net learning? Discuss Winner-Take-All learning rule in detail. **[8]**

b) Compare and discuss the features of LMS and Perceptron learning laws. **[8]**

OR

Q2) a) What is Linear Separability? Illustrate with example. **[8]**

b) What is weight vector in ANN training? How it is described in following learning laws: **[8]**

i) Hebb's Law and

ii) Delta Learning Law

Q3) a) What is linearly Non-separable classification problem? Can single Perceptron solve such problem? Discuss ADALINE computing model of a neuron. **[10]**

b) Write the algorithmic steps of Back propagation training algorithm. How we decide the number of neurons in the input and output layer of Feed Forward Network? **[8]**

P.T.O.

OR

Q4) a) Explain architecture, algorithm and applications of ADALINE and MADALINE. **[10]**

b) What is an Activation Function? How it helps in Neural Network training? Explain any Two activation functions. **[8]**

Q5) a) Explain the Boltzmann learning algorithm for binary units. **[8]**

b) What do you mean by associative learning? Discuss the architecture and operation of Hopfield Network. **[8]**

OR

Q6) a) What is the objective of pattern storage network? Explain the meaning of activation state and energy landscape of a feedback network. **[8]**

b) With example illustrate the concept of stochastic update and thermal equilibrium. **[8]**

SECTION - II

Q7) a) How pattern Clustering is different than Classification? Explain with algorithm the self-organizing network used for feature mapping. **[10]**

b) Explain the ART Training algorithm used for pattern clustering. **[8]**

OR

Q8) a) What is vector quantization? Explain the algorithm and discuss how it can be used for pattern clustering. **[10]**

b) Discuss Hybrid Learning procedure applied to RBFN. **[8]**

Q9) a) Compare and Discuss the learning of SVM and RBFN. **[8]**

b) Explain the steps in the solution of a general optimization problem by ANN. **[8]**

OR

Q10)a) Discuss in brief auto-association and hetero-association process used for neural processing. **[8]**

b) Explain the use of ANN in character recognition. Comment on the feature vector and training required for the recognition task. **[8]**

Q11)a) What is Soft Computing? What are the application areas of Soft Computing? What do you mean by hybrid systems? **[8]**

b) How Fuzzy sets are different than traditional set? How Fuzzy logic can be used with Neural Networks for supervised or unsupervised learning? **[8]**

OR

Q12)a) Compare Neuro Fuzzy systems with traditional Neural systems. State the advantages and disadvantages. **[8]**

b) Explain the architecture of any suitable Neuro Fuzzy system designed for pattern recognition task. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2972

[Total No. of Pages : 4

[5354]-187

B.E. (Computer Engineering)

ADVANCE DATABASES

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from Section - I and three questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain design issues of parallel system. **[6]**

b) Describe the benefits and drawbacks of pipelined parallelism. **[4]**

c) Describe a good way to parallelize each of the following: **[6]**

i) Selection

ii) Projection

iii) Aggregation

OR

Q2) a) Explain different partitioning techniques. **[6]**

b) Differentiate between interquery parallelism and intraquery parallelism **[6]**

c) Write a short note on parallel query optimization. **[4]**

Q3) a) Explain the difference between data replication in a distributed and the maintenance of a remote backup site. **[8]**

b) Explain Data fragmentation in distributed databases. **[6]**

c) Explain LDAP Data model. **[4]**

OR

P.T.O.

Q4) a) Explain in detail deadlock handing in distributed databases. **[8]**

b) Give example where the read one, write all available approach leads to an erroneous state. **[6]**

c) Explain any two Locking protocols with respect to distributed databases. **[4]**

Q5) a) Explain 3-tier client-server architecture in detail. **[8]**

b) Write short note on Web services. **[6]**

c) What is XSLT? **[2]**

OR

Q6) a) Explain the components of an XSL document with suitable example. **[8]**

b) Consider the following recursive DTD **[8]**

```
<! DOCTYPE parts [
<!ELEMENT parts (name, subpart info*)>
<!ELEMENT subpart info (part, quantity)>
<!ELEMENT name (# PCDATA)>
<!ELEMENT quality (# PCDATA)>
]>
```

Create a scheme in XSL scheme corresponding to this DTD.

SECTION - II

Q7) a) Explain multidimensional data models in details. **[8]**

b) Explain the following **[8]**

i) OLAP

ii) Data Cube

OR

Q8) a) Explain CUBE and ROLL-UP extended aggregation with suitable example. **[8]**

b) Explain the architecture of data warehouse and also explain different indexing technique used in data warehouse. **[8]**

Q9) a) What are different data cleaning methods? Explain binning & outlier analysis. **[6]**

b) State and explain K-MEANS algorithm for clustering. **[6]**

c) Consider the following data set. **[6]**

Food Item	Protein content	Fat Content
Fl	1.1	60
F2	8.2	20
F3	4.2	35
F4	1.5	21
F5	7.6	15
F6	2.0	55
F7	3.9	39

Find the cluster for the object in the dataset by using K-means algorithm ,if k = 4.

OR

Q10)a) What is Best split? Explain 1D3 algorithm to create decision tree. **[6]**

b) Explain the following: **[6]**

i) Text mining

ii) GINI index

iii) Information gain

c) Find the association rule for the given dataset which satisfy following requirements **[6]**

1) Support = 30%

2) Confidence = 90%

Customer	Products			
Cl	S1		S3	
C2		S2		
C3				S4
C4		S2	S3	S4
C5		S2	S3	
C6		S2	S3	
C7	S1	S2	S3	S4
C8	S1		S3	
C9	S1	S2	S3	
C10	S1	S2	S3	

Q11)a) What you mean by relevance ranking? Explain different methods of relevance ranking for the boolen & ranked query. **[8]**

b) Explain the following: **[8]**

i) Inverted Index

ii) Ontologies

iii) Stop words

OR

Q12)a) What is page ranking and popularity ranking? Explain in brief. **[6]**

b) Explain the following terms : **[10]**

i) Web crawlers.

ii) Homonyms.

iii) Vector space model.

iv) Zipfian distribution.

Total No. of Questions : 12]

SEAT No. : ____

P2973

[Total No. of Pages : 3

[5354]-188

B.E. (Computer Engineering)

VLSI & DIGITAL SYSTEM DESIGN

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answer Question No. 1 OR 2, 3 OR 4 and 5 OR 6 from Section I and Q. No. 7 OR 8, 9 OR 10 and 11 OR 12 from Section II.***
2) ***Answers to the two Sections should be written in separate answer books.***
3) ***Neat diagram must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare Speed-Power performance of available technologies. **[8]**

b) Explain types of technology scaling. **[9]**

OR

Q2) a) Explain design methodology with flow chart for ASIC design. **[9]**

b) Explain classification of IC technology based on design style. **[8]**

Q3) a) Explain Shallow Trench Isolation (STI) with process flow. **[8]**

b) Describe different limiting performance of CMOS. **[9]**

OR

Q4) a) Explain merits and demerits of Cu interconnect. **[8]**

b) Write short note on **[9]**

i) Gate formation

ii) Contact formation

iii) Source drain region formation

P.T.O.

Q5) a) Explain basic properties of Silicon Wafer. **[4]**

b) Explain Czochrlski and Float-Zone Crystal growth methods. **[4]**

c) Explain Chemical vapor oxidation technique. **[8]**

OR

Q6) a) Write a short note on **[8]**

i) Optical Lithography

ii) Thermal Oxidation

b) Explain wet etching and plasma etching. **[8]**

SECTION - II

Q7) a) Write code in VHDL for 16:1 multiplexer. **[8]**

b) Explain different Modelling styles in HDL. **[9]**

OR

Q8) a) Explain following terms with examples **[9]**

i) Identifier

ii) Variable

iii) Array

b) Write VHDL Code for Lift controller. **[8]**

Q9) a) Explain the types of programmable logic devices in detail. **[8]**

b) Explain Application Specific IC's Design flow. **[4]**

c) Explain CMOS inverter with VTC. **[4]**

OR

Q10)a) Explain static and dynamic behaviour of CMOS devices and circuits. **[8]**

b) Explain role of software tools in digital design. Explain the types of software tools in VLSI design. **[8]**

Q11)a) Explain different design parameters for digital circuit design. **[5]**

b) List out different steps for designing clocked synchronous machine. **[8]**

c) Explain merits and demerits of FPGA. **[4]**

OR

Q12)a) Draw neat diagram and explain briefly 6-T SRAM. **[8]**

b) For clock circuitry explain the following **[9]**

i) Clock skew

ii) Clock jitter

iii) Slew

❖❖❖❖

Total No. of Questions : 12]

SEAT No. :

P2974

[Total No. of Pages : 2

[5354]-189

B.E. (Computer Engineering/IT)

CLOUD COMPUTING

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer THREE questions from each section.***
2) ***Answers to the TWO sections should be written in SEPARATE answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagram wherever necessary.***
5) ***Make suitable assumptions wherever necessary.***

SECTION - I

Q1) a) How cloud computing services uses various component ? Describe in detail types of clouds. **[8]**

b) Compare and contrast between Public versus Private Cloud in accordance with economies of scale. **[8]**

c) What is self service provisioning? **[2]**

OR

Q2) a) Incline and explain three services model and four deployment models of cloud computing. **[8]**

b) Explain the services provided by the Microsoft Azure. **[8]**

c) Define cloud Computing. **[2]**

Q3) a) What is difference between process virtual machines, host VMMs and native VMMs. **[8]**

b) Compare and contrast between SOAP and REST **[8]**

OR

Q4) a) What is role of web services? How asynchronous 'rich' interfaces applied for deployment of cloud services? **[8]**

b) Describe with example Mashups. **[8]**

P.T.O.

Q5) a) Explain in detail architecture of cloud file systems? **[8]**

b) Explain how data organization in big tables are stored on distributed file systems such as GFS and HDFS. **[8]**

OR

Q6) a) Explain scalable parallel implementation with suitable example of Mapreduce Model. **[8]**

b) How amazon dynamo works for data storage in cloud file systems? **[8]**

SECTION - II

Q7) a) Describe security management levels with suitable diagram. **[8]**

b) Write in brief access control in PaaS **[8]**

OR

Q8) a) What are different key privacy in cloud environment. **[8]**

b) Explain fundamental functions : identity management, access control for secure cloud computing. **[8]**

Q9) a) Explain in detail load computation across multiple implementation. Describe in brief virtual and horizontal load distribution. **[8]**

b) What are the temporal requirement for QOS? Describe in aggregation of work flow in load distribution. **[8]**

OR

Q10)a) Compare different issues in inter-cloud environments. **[8]**

b) Explain in detail how QoS monitoring deployed in cloud computing? **[8]**

Q11)a) Explain in detail performance evaluation feature of Apache Virtual platform. **[9]**

b) Explain conceptual representation of Eucalyptus Cloud with its components. **[9]**

OR

Q12)a) Write a short note on Xen cloud platform. **[9]**

b) Describe performance evaluation Features and functions of Enomaly Elastic Computing cloud platforms. **[9]**

Total No. of Questions : 12]

SEAT No. :

P2975

[Total No. of Pages : 2

[5354]-190

B.E. (Computer Engineering)

INFORMATION SECURITY

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from Section - I and three questions from Section - II.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define cryptography and explain any one cryptographic algorithm. **[9]**

b) What is authentication? Explain algorithm to describe authentication. **[9]**

OR

Q2) a) Describe lifecycle of Information Security. **[9]**

b) Enlist and explain needs of Information Security. **[9]**

Q3) a) Explain AES algorithm in detail. **[8]**

b) Differentiate AES with DES. **[8]**

OR

Q4) a) Describe IDEA algorithm in detail. **[8]**

b) Enlist and explain needs of key distribution in detail. **[8]**

Q5) a) Describe D.H. algorithm in detail with suitable example. **[8]**

b) Explain elliptical curve cryptography in short. **[8]**

OR

P.T.O.

Q6) a) What is public key cryptography? Explain in short. **[8]**

b) Explain man-in-middle attack in detail. **[8]**

SECTION - II

Q7) a) What is MAC? Explain HMAC in detail with suitable diagram. **[9]**

b) What is DSA? Explain with suitable diagram. **[9]**

OR

Q8) a) Define PKI. Explain PKI in detail. **[9]**

b) What are different requirements of message authentication? Explain each in detail. **[9]**

Q9) a) What are different principles of firewall designing? Explain in details. **[8]**

b) What is IDS? Explain IDS with suitable examples. **[8]**

OR

Q10)a) What is IPS? Compare IPS with IDS. **[8]**

b) Differentiate TLS and SSL. **[8]**

Q11)a) What is SEC? Explain in detail. **[8]**

b) Define PEM. Discuss it in short. **[8]**

OR

Q12)Write a short note on following (any four) : **[16]**

a) OSI security architecture

b) Security consideration

c) PEM

d) Analysis of Security Services

e) Merits and demerits of public key algorithm

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2976

[Total No. of Pages : 3

[5354]-191
B.E. (Information Technology)
INFORMATION ASSURANCE & SECURITY
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer of question 1 or 2, 3 or 4, and 5 or 6 from Section - I and question 7 or 8,9 or 10 and 11 or 12 from Section - II***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What is attack? Explain different types of attacks? **[10]**

b) Illustrate how to share and split the secret and its significance in some application. **[8]**

OR

Q2) a) What is Chinese remainder theorem? Explain with examples. **[10]**

b) Enlist the security goals and mechanism in details. **[8]**

Q3) Describe the different modes of operation (ECB: CBC, CFB. OFB & CTR mode) with the help of block diagram. **[16]**

OR

Q4) a) Write working of AES algorithm in detail. **[8]**

b) Differentiate between MD5 and SHA-1algorithm. **[8]**

Q5) a) List and state the channels of key distribution in symmetric and asymmetric key systems. **[8]**

b) Illustrate the Diffiee Hellman key exchange protocol. **[8]**

P.T.O.

OR

Q6) a) What is PKI? Explain the different PKI architectures. **[8]**

b) How digital certificate creation takes place'? Enlist the contents of Digital certificate. **[8]**

SECTION - II

Q7) a) What is IPSEC? How does AH and ESP differ while working under Tunnel mode and Transport mode. **[10]**

b) What do you mean by internet key exchange protocol? Explain its different phases. **[8]**

OR

Q8) a) Discuss the SSL with respect to four phases. **[10]**

i) Establish Security Capabilities

ii) Server Authentication and Key Exchange

iii) Server Authentication and Key Exchange

iv) Finish

b) Explain different IDS methods with one example each. **[8]**

Q9) a) Explain concept of mobile payment system. **[8]**

b) Explain domains of ISO 27001 security standard and state its purpose. **[8]**

OR

Q10)a) Explain and draw model for ISMS(Information Security Management System) of PDCA Cycle(Plan, Do, Check, Act phase). **[8]**

b) Illustrate idea of Electronic Cash. **[8]**

Q11) Write a short note on following(any four) **[16]**

a) Electronic evidence.

b) Internet fraud

c) Identity theft

d) Computer Forensic

e) Cyber tourism

OR

Q12) a) Illustrate Industrial Espionage in IT industry. **[8]**

b) List some of the cyber crime and respective penalties **[8]**

Total No. of Questions : 12]

SEAT No. :

P2977

[Total No. of Pages : 3

[5354]-192
B.E. (Information Technology)
OBJECT ORIENTED MODELING AND DESIGN
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section I and***
2) ***Solve Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section II***
3) ***Answers to the two sections should be written in separate books.***
4) ***Figures to the right indicate full marks.***
5) ***Neat diagrams must be drawn wherever necessary.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define State Diagram and State Model. Develop a State Machine Diagram for an elevator system of a building. State clearly the assumptions you make about the system. **[8]**

b) What is an association end? What are the properties of association end? **[6]**

c) Discuss by giving appropriate example when will you model an entity such as 'bank account' as **[4]**

i) Attribute

ii) Class

OR

Q2) a) Explain 4+1 view architecture with corresponding UML diagram. **[8]**

b) Discuss the difference between Inception and Elaboration phases of Rational Unified Model. **[6]**

c) Compare Interface and Port giving examples. **[4]**

Q3) a) OMG standard CORBA is a standard for middleware to develop distributed networked applications. Explain the following concepts in context of distributed application and CORBA. 1) Distributed objects/ components 2) Stubs and Skeletons 3)Interfaces **[8]**

b) How do you show an OBJECT in a class diagram, explain with an appropriate example and with correct notation the conversion of class diagram into object diagram? **[8]**

P.T.O.

OR

Q4) a) Write a short note on UML versions **[8]**

b) Explain the need of XML, MOF and XMI **[8]**

Q5) a) What is use case diagram? Identify the various use cases and draw the use case diagram for "Online Examination System". **[8]**

b) The system is for a marketing company. We have the country divided into marketing regions. Salespersons work for regions. Salespersons make sale that are described in terms of the day of sale, the products sold with quantity and rate. The products are categorized into two categories: Indian products and imported products. Draw the class diagram using aggregation. inheritance, association, dependency and realization relationships to model above system. **[8]**

OR

Q6) a) Write a note on Composite Structure Diagram **[4]**

b) Draw a package diagram for "Online Hotel Booking System "showing packages, package relationships. **[4]**

c) Draw a class diagram for "Online Railway Reservation System" using advanced notations. Assume suitable data. **[8]**

SECTION - II

Q7) a) An auto rental company wants to develop an automated system that would handle car reservations, customer billing, and car auctions. Usually a customer reserves a car, picks it up, and then returns it after a certain period of time. At the time of pick up, the customer has the option to buy or waive collision insurance on the car. When the car is returned, the customer receives a bill and pays the specified amount. In addition to renting out cars, every six months or so, the auto rental company auctions the cars that have accumulated over 20,000 miles. Draw a use- case diagram for capturing the requirements of the system to be developed. Include an abstract use case for capturing the common behavior among any two use cases. Extend the diagram to capture corporate billing, where corporate customers are not billed directly; rather the corporations they work for are billed and payments are making sometime later. **[8]**

b) Write a short note on deployment diagrams, need, example, and notation. **[6]**

c) Compare Forward Engineering and Reverse Engineering. **[4]**

OR

Q8) a) Draw a sequence diagram for 'Schedule a faculty meeting'. Here are some of the assumptions. The HOD interacts through a (GUI) form to schedule the meeting. A special control object called scheduler does the automated meeting scheduling. The scheduler bases its decision on free slots in the (entity object) timetable. The entire faculty involved will get an invitation through SMS on their mobiles .The system depends on an external mobile gateway subsystem to handle forwarding SMS's. **[8]**

b) What is Sequence Diagram? What are the elements used in Sequence Diagram explain with example. **[6]**

c) Explain the concept of 'asynchronous message' with a suitable example in the context of Sequence Diagram. **[4]**

Q9) a) Draw the Activity diagram for withdrawing money from ATM. **[8]**

b) Explain association and aggregation with an example. **[8]**

OR

Q10)a) Describe Branching and Forking in Activity diagram with suitable example **[8]**

b) What is the purpose of an Interaction Diagram? Explain with suitable example the different types of interaction diagrams in UML 2.0. **[8]**

Q11)a) Draw the sequence diagram for issuing CD/DVD from video library **[8]**

b) What is pattern? How it is categorized? Describe one category with an example. **[8]**

OR

Q12 a) Write a note on Communication Diagram. **[4]**

b) With suitable example, explain different use case relationships. **[4]**

c) Write note on applications of UML in embedded system. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2978

[Total No. of Pages : 3

[5354]-193
B.E. (I.T.)
SOFTWARE TESTING AND QUALITY ASSURANCE
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer question 1 or 2, 3 or 4, 5 or 6,from Section I and question 7 or 8, 9 or 10 and 11 or 12 from Section II.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, jf necessary.***

SECTION - I

Q1) a) Define Testing. Explain the difference between the following: **[10]**

i) White box and Black box Testing.

ii) Load and stress testing.

iii) Verification and validation.

iv) Defect severity and defect priority.

b) What is the importance of Integration Testing? Explain the strategies/ approaches for Integration Testing. **[8]**

OR

Q2) a) Define Test Adequacy criteria. Is complete testing possible? When to stop testing? Explain the difference between random testing and testing using error guessing. **[8]**

b) What is the importance of System Testing? Explain the following methods of Testing with examples: **[10]**

i) Functional Testing

ii) Security Testing

iii) Performance Testing

P.T.O.

Q3) a) Draw and explain the various stages of Software Test Life Cycle. **[8]**

b) What is control flow graph? How is it used in white box testing? How is the cyclomatic complexity value useful to the tester? **[8]**

OR

Q4) a) Explain Equivalence Class Partitioning and Boundary Value Analysis. Develop black box test cases for an ATM system which reads the amount to be withdrawn from the users account. The amount has to be a multiple of Rs.100 and be less than Rs.l0,000. List any assumptions you make and label equivalence classes and boundary values that you use. **[8]**

b) Explain the contents of a Test Plan in detail. **[8]**

Q5) a) Write a note on Control Flow Structures. Explain with example sequencing and nesting of flow graphs. **[8]**

b) Explain in short the following metrics used in software testing: **[8]**

i) Test coverage

ii) Test Execution status

iii) Defect density

iv) Defect leakage.

OR

Q6) a) Define measurement scale and explain the Nominal, Ordinal, and Interval scales of measurement. **[8]**

b) Explain GQM technique in detail. Draw a GQM tree to Improve Maintainability. **[8]**

SECTION - II

Q7) a) Explain the following software reliability quality attributes in short: **[10]**

i) Usability

ii) Portability

iii) Maintainability

iv) Interoperability

v) Integrity

b) Explain the following terms w.r.t software quality: **[8]**

i) Quality

ii) Quality Assurance

iii) Quality control

iv) Cost of Quality

OR

Q8) a) List Ishikawa's Seven Basic Quality Tools. Explain Pareto Chart, Histogram and Cause and Effect diagram with example. **[10]**

b) Explain the objectives and elements of software reviews and inspections. **[8]**

Q9) a) Differentiate between CMM and CMMI quality models. **[8]**

b) How does the performance improve with Six Sigma? Explain the methodology DMAIC with reference to Six Sigma. **[8]**

OR

Q10)a) Explain the PDCA cycle in detail with reference to ISO 9000:9001. **[8]**

b) List all the requirements of ISO 9000 and ISO 9001. How does ISO 9000/9001 ensure production of good quality software? **[8]**

Q11)a) Explain the goals and activities performed in the following KPA's: **[8]**

i) Software Product Engineering.

ii) Software Configuration Management.

b) Describe the various levels of CMM along with the KPA's for the levels. **[8]**

OR

Q12)a) How is defect prevention and process change management brought into practice? **[8]**

b) Write notes on: **[8]**

i) Defect prevention

ii) Peer reviews

Total No. of Questions : 12]

SEAT No. :

P2979

[Total No. of Pages : 3

[5354]-194

B.E. (I.T.)

ADVANCED DATABASE MANAGEMENT

(2008 Pattern) (Elective - I) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q1 or 2, Q3 or 4, Q5 or 6, Q7 or 8, Q9 or 10, Q11 or 12.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is procedure? Explain procedure with suitable example. **[8]**

b) Explain PL/SQL transactions in detail. **[8]**

OR

Q2) a) Write an PL/SQL code for printing even numbers in the range of 1 to 100. **[8]**

b) Explain the concept of embedded SQL. **[8]**

Q3) a) With neat and clean diagram explain transaction processing monitors. **[8]**

b) Write what do you mean by real time databases. **[8]**

OR

Q4) a) Explain time stamping concurrency control protocol with suitable example. **[8]**

b) Explain following **:** **[8]**

i) Backward & forward validations

ii) ACID properties.

P.T.O.

Q5) a) Explain transaction management in multi databases. **[8]**

b) Write difference bet^{n} OO & OR features. **[8]**

c) Explain multisets in SQL. **[2]**

OR

Q6) a) Write short note on API in XML. **[8]**

b) Explain in detail about querying & transformation in XML. **[10]**

SECTION - II

Q7) a) What do you mean by data warehouse? Also explain benefits & problems of data warehousing. **[8]**

b) Explain DW architecture with neat diagram. **[8]**

OR

Q8) a) Explain different data warehouse tools with example. **[8]**

b) Write DW design using oracle. **[8]**

Q9) a) What do you mean by data mining. Explain any one technique in detail. **[8]**

b) Discuss OLAP benchmarks. **[8]**

OR

Q10)a) What do you mean by OLAP? Also discuss applications, benefit, tools & categories for OLAP. **[8]**

b) Explain what is Apriori algorithm? Discuss with suitable example. **[8]**

Q11)a) Write on statistical database security with example. **[8]**

b) What do you mean by locks? Explain types of locks in detail. **[6]**

c) Discuss any decision tree algo with example. **[4]**

OR

Q12)a) Explain in detail about integrity threats & defence mechanism in DBMS. **[8]**

b) Explain Bayes net classifier with example. **[8]**

c) What is granting & revoking of privileges. **[2]**

Total No. of Questions : 12]

SEAT No. :

P2980

[Total No. of Pages : 3

[5354]-195
B.E. (Information Technology)
ARTIFICIAL INTELLIGENCE
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the TWO sections should be written in separate sheet.***
2) ***Use of logarithmic tables, slide rules and electronic pocket calculator is allowed.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicates full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is artificial intelligence? What are the goals to pursue in artificial intelligence **[8]**

b) Define Rationality and Rational Agent. Give an example of rational action performed by any intelligent agent. **[8]**

OR

Q2) a) What is intelligent agent? Explain how agents should act? **[8]**

b) What is the difference between a performance measure and a utility function?Give suitable example. **[8]**

Q3) a) Explain minimax algorithm with suitable example. **[8]**

b) It is suggested to you that an application previously addressed as a constraint satisfaction problem might alternatively be solved using some variant of local search. Is this a reasonable suggestion? If it is, then outline a way in which it might be achieved. If not, then provide a reasoned discussion explaining why. **[8]**

OR

P.T.O.

Q4) a) Explain what A* search is, including the advantages and disadvantages with respect to its theoretical properties. **[8]**

b) How does hill climbing ensure greedy local search? What are the problems of hill climbing? **[8]**

Q5) a) What are the levels of knowledge used in language understanding? Also write down the techniques used in NLP. **[9]**

b) What are the various approaches in knowledge representations? **[9]**

OR

Q6) a) With suitable examples, explain the steps needed to convert a WFF in predicate logic to its equivalent clause form. **[9]**

b) Represent the following sentences in First Order Logic. **[9]**

i) Parent and child are inverse relations.

ii) Two sets are equal if and only if each is a subset of the other.

iii) Connected is a commutative predicate

iv) Every student who takes French passes it.

v) No person buys an expensive policy

SECTION - II

Q7) a) Explain in details the concept of STRIPS planning system. **[8]**

b) Explain Hierarchical planning and least commitment strategy. **[8]**

OR

Q8) a) Explain in brief how computer vision can be used for robot navigation? **[8]**

b) What are different methods for extracting 3D information from the image or video? Explain in brief. **[8]**

Q9) a) What is learning? Enumerate different forms of learning. **[8]**

b) Draw and explain the architecture of expert system. **[8]**

OR

Q10)a) What is Connectionism? Explain the basic components of a connectionist system. **[8]**

b) Explain the process of knowledge acquisition system in an expert system. Give suitable example. **[8]**

Q11)a) Explain what is parallel and distributed artificial intelligence. **[9]**

b) What is Prolog? Describe the meaning of the following statements in Prolog **[9]**

i) X = Y

ii) X is Y

iii) X=\=Y

iv) X \ = = Y

OR

Q12)a) How Genetic Algorithm is different from traditional algorithms? Explain with suitable examples. **[9]**

b) Define the following as used in PROLOG **[9]**

i) Facts

ii) Rules

iii) Clauses

iv) Unification

Total No. of Questions : 12]

SEAT No. :

P2981

[Total No. of Pages : 3

[5354]-196
B.E. (I.T.) (Elective - I)
COMPILER DESIGN
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two Sections should be written in separate answer-books***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of the block diagram explain phases of the compiler. Also write down output of each phase of the compiler for expression A = B+C *10 **[10]**

b) Discuss the merits and demerits of a compiler and an interpreter. **[6]**

OR

Q2) a) Explain Lex specification with example. **[8]**

i) Write a LEX program which find out factors of a given number

ii) Write a LEX program to find the area of circle.

b) Write short note on LEX. **[8]**

Q3) a) For following grammar

$S \rightarrow AaBb$

$A \rightarrow \varepsilon$

$B \rightarrow \varepsilon$

i) Compute first and follow sets. **[6]**

ii) Construct LL(1) parser **[4]**

iii) Parse string ab" with above parser **[2]**

b) Differentiate between top down and bottom up parser **[6]**

P.T.O.

OR

Q4) Consider the following grammar, and construct the LR (1) parsing table. **[18]**

$S \rightarrow L = R$

$S \rightarrow R$

$R \rightarrow L$

$L \rightarrow * R$

$L \rightarrow id$

$L \rightarrow \varepsilon$

Q5) a) Write syntax directed translation to translate the following for statement into three address code statements. **[8]**

$S \rightarrow$ for (El, E2, E3) S_1

b) Write three address sequences for the following

i) switch (ch) **[4]**

```
{
    case 1 : a = b * c;
             Break;
    case 2 : a = b / c:
             Break;
}
```

ii) while x > y do **[4]**

```
    if c < d then
       a = b + c
    else
       a = b – c
```

OR

Q6) a) Write a grammar for simple procedure call. Give a syntax directed translation scheme for the same **[8]**

b) Write three address sequences for the following

i) a < b and x > y or p > q **[4]**

ii) ifx > y then x = x + 10 else y = y + 10 **[4]**

SECTION - II

Q7) a) Write short note on activation records. **[8]**

b) Explain the significance and Design of symbol table in the context of compiler. **[8]**

OR

Q8) a) Explain Dynamic Storage Allocation Techniques. **[8]**

b) Explain following storage allocation schemes with proper examples **[8]**

i) Stack storage allocation

ii) Heap storage allocation

Q 9) a) Explain sethi-Ullman algorithm for code generation with example. **[10]**

b) Write Quadruple and Triple representation of following expression **[8]**

x : = y/ - z - y/ - z - y*z

OR

Q10)a) Consider the following expression construct the labelled tree and write code from the tree

((a – (b* c)) + (c – (d/e))). **[10]**

b) Discuss different issues in code generation phase **[8]**

Q11)a) Explain differences between class based language and object based language with example **[8]**

b) Explain different types of inheritance with example. **[8]**

OR

Q12)a) Explain principles of object oriented programming with example. **[8]**

b) Explain exception handling in object oriented programming with example **[8]**

Total No. of Questions : 12]

SEAT No. :

P2982

[Total No. of Pages : 3

[5354]-197
B.E. (I.T.)
ADVANCED OPERATING SYSTEM
(2008 Pattern) (Elective - I) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

SECTION - I

Q1) a) Define and explain following Operating System in Detail with necessary eg. **[10]**

i) Monolithic Kernel

ii) Exokernel

b) Explain the services provided by the operating system for Memory management. **[8]**

OR

Q2) a) Why multiple queues are in process scheduling? Explain multilevel queue and multilevel queue with feedback scheduling. **[10]**

b) Differentiate between process and thread. Draw and explain PCB and TCB. **[8]**

Q3) a) Give Functional specification for SEND, RECEIVE, DISPATCH primitives. **[8]**

b) Write structure of PCB in KMOS. Describe its various fields. **[8]**

OR

Q4) a) How various system lists are maintained in KMOS? Explain with suitable diagram. **[8]**

b) Explain the functional specifications of KMOSSTART and KMOSCLOCK **[8]**

P.T.O.

Q5) a) Explain different multiprocessor interconnection types with necessary diagrams. **[8]**

b) Explain parallel programming with suitable algorithm. **[8]**

OR

Q6) a) Explain the classification of shared memory multiprocessors on the basis of memory architecture and access delays **[8]**

b) Explain the wave scheduling with respect to multiprocessor O.S. **[8]**

SECTION - II

Q7) a) What are the different ways to deal with external fragmentation? **[10]**

b) Explain high memory mapping with its type. **[8]**

OR

Q8) a) Explain kmalloc() and vmalloc() system calls with pseudocode. **[10]**

b) Write a note on statically allocating on stack. **[8]**

Q9) a) Explain with suitable diagram kernel I/O subsystem. **[8]**

b) Explain generalized device drivers. **[8]**

OR

Q10)a) Explain the concept of disk caching. **[8]**

b) Explain kernel data structures for I/O management. **[8]**

Q11) a) Explain following system calls with eg. **[8]**

i) unmount ii) Write

iii) Iseek iv) link

b) Explain in detail Virtual File System. **[8]**

OR

Q12) a) Explain the process of mapping and unmapping of file blocks. **[8]**

b) Write a note on I/O scheduler. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2983

[Total No. of Pages : 3

[5354]-199
B.E. (I.T.)
MOBILE COMPUTING
(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data jf necessary.***

SECTION - I

Q1) a) What is Intelligent Network? Explain in detail Signalling system 7 with neat diagram. **[7]**

b) What is Handoff? Explain in detail different Handoff techniques. **[9]**

OR

Q2) a) Explain in detail PCS architecture with neat diagram. **[9]**

b) Explain in detail the concept of cell splitting and frequency reuse. **[7]**

Q3) a) Explain in detail GSM Architecture with neat diagram. **[8]**

b) Explain the concept of VLR overflow & HLR failure restoration. **[8]**

OR

Q4) a) Explain in detail GSM MAP Dialogue. **[8]**

b) What is location tracking in GSM? How mobility database is maintained in GSM? **[8]**

P.T.O.

Q5) a) Explain in detail with neat diagram SMS architecture. **[9]**

b) Explain in detail international call set up of GSM. **[9]**

OR

Q6) a) Explain in detail Mobile prepaid and post paid services. **[9]**

b) What are advantages of number portability? Explain in detail number portability for mobile networks. **[9]**

SECTION - II

Q7) a) What are different layers in WAP protocol stack? Explain in detail WAP protocol stack neat diagram. **[8]**

b) What is mean by supporting node in GPRS? Explain in detail GPRS architecture with neat diagram. **[8]**

OR

Q8) a) Describe in detail GPRS attachment and detachment procedure. **[8]**

b) Explain in detail CDMA. **[8]**

Q 9) a) What is adhoc network? Explain in detail MANET. **[8]**

b) Explain in detail DHCP. **[8]**

OR

Q10)a) Explain in detail dynamic source routing. **[8]**

b) What is need Mobile IP? Explain in detail IPv6. **[8]**

Q11)a) Explain in detail UMTS technology. **[10]**

b) Explain in detail W-LAN **[8]**

OR

Q12)Write short note on: (6 Marks each) **[18]**

a) Spread Spectrum Technology.

b) WiMAX

c) Blutooth Technology

Total No. of Questions : 12]

SEAT No. :

P2822

[Total No. of Pages : 4

[5354] - 2
B.E. (Civil)
DAMS & HYDRAULIC STRUCTURES
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.***
2) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Write short note on problems in Dam construction. **[4]**

b) Briefly explain the meaning of storage dam, diversion dam, overflow dam & rigid dam. **[4]**

c) Dam instruments stress meter and strain meter. **[4]**

d) Factors affecting selection of site of dam. **[4]**

OR

Q2) a) Application of remote sensing and GIS to watershed management. **[4]**

b) Discuss the data required to be collected before the construction of a dam. **[4]**

c) Write short note on Rock fill dam. **[4]**

d) Write short note on Arch dam. **[4]**

Q3) a) Write note on grouting of gravity dam. **[4]**

b) Discuss various modes of failure of gravity dam. **[4]**

c) Explain two dimensional analytical method for stability analysis of gravity dam. **[10]**

P.T.O.

OR

Q4) a) Derive an expression for the limiting height of gravity dam. **[4]**

b) Write note on gallaries in gravity dams their location and purpose. **[4]**

c) Explain the various forces acting on a gravity dam for reservoir full condition at least five with sketch of dam. **[10]**

Q5) a) State merits and demerits of an earthen dam. **[4]**

b) State various causes of failure of earthen dam. **[4]**

c) Determine the pheretic line for an earthen dam homogeneous in section from the following data **[8]**

i) Ht. of dam = 20m.

ii) Free board = 2m.

iii) Coefficient of permeability of material of dam = 4×10^{-4} cm/sec.

iv) Top width = 4m.

v) Upstream slope 3:1.

vi) Down stream slope 3:1.

OR

Q6) a) What is meant by piping in earthen dam. **[4]**

b) State the advantages of rock fill dams against earthen dam. **[4]**

c) What is meant by pheretic line? How will you determine the pheretic line in case of homogeneous earthen dam. **[8]**

SECTION - II

Q7) a) Explain necessity of inspection, maintenance and safety of Spillway gates. **[5]**

b) Briefly explain Diversion Head Work with sketches. **[5]**

c) Design the crest of spillway of 125 m length to carry a discharge of 2500 m^3/sec. Assume the level of bed of river as 500 m. and the level of water to be 550 m. D/S slope 0.8 H : 1V. **[8]**

OR

Q8) a) Write a note on Khosla's theory of independent variable for hydraulic design of weir on previous foundation. Draw relevant sketch. **[5]**

b) Explain Lanes weighted creep theory. **[5]**

c) Discuss various types of energy dissipation devices used below spillway in relation to the position at tail water depth & jump height curve. **[8]**

Q9) a) Write notes on: **[8]**

i) Financial justification (cost benefit) of canal lining.

ii) Canal escape.

b) Write notes on: **[8]**

i) Rapid falls.

ii) Notch falls.

iii) Stepped falls.

iv) Glacies type fall.

OR

Q10) a) Check whether following canal parameters confirm to Kennedys theory of canal design **[8]**

Full supply discharge = 45 m^3/s

Full slope depth = 1.8 m,

Bed slope of channel 1 in 4000

Side slopes 1H : 2V

Bed width 30 m

Critical velocity ratio = 1.17

Mannings constant n = 0.0225

b) What are the various canal regulation works? **[4]**

c) Define regime channel & silt factor. **[4]**

Q11) a) Write short notes on: **[8]**

i) Objective and methods of river training.

ii) Write a detailed note on levees with the help of neatly drawn labelled cross section of typical levee.

b) Draw a neat sketch of High Head Hydropower Plant. Explain its essential components with sketches & working. **[8]**

OR

Q12) a) What is cutoff? Describe briefly how a cutoff may be used as a river training measure. Also describe pitched is land. **[8]**

b) Define: **[8]**

i) Design Head.

ii) Gross Head.

iii) Load factor.

iv) Demand factor.

v) Capacity factor.

vi) Utilisation factor.

Total No. of Questions : 12]

SEAT No. :

P2834

[Total No. of Pages : 3

[5354] - 20
B.E. (Civil) (Semester - I)
CONSTRUCTION MANAGEMENT
(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, from Section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II..***
2) ***Answers to the two sections should be written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of logarithmic tables, slide rule, electronic pocket calculator and statistical tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain project monitoring and reporting system at each phase of construction with suitable example. **[8]**

b) How Infrastructure development in India has contributed majorly in the country's economic growth? **[6]**

c) Explain the necessity & applications of Construction Management. **[4]**

OR

Q2) a) What do you mean by Project Management Consultant? Explain its role in case fly over construction. **[8]**

b) What is role of construction industry in economic development? **[6]**

c) What are the reasons of project overruns? **[4]**

P.T.O.

Q3) a) What are the factors affecting on scheduling? **[4]**

b) What is WBS? Explain the WBS levels with suitable example? **[6]**

c) Draw & explain a string diagram with suitable example. **[6]**

OR

Q4) a) List out the various symbols used for different activities. **[4]**

b) Define work study and explain the procedure of work study. **[6]**

c) Write a note on Line of balance (LOB) technique with suitable example. **[6]**

Q5) Write short note on following, any four : **[16]**

a) Building and other construction workers Act 1996.

b) Child labor Act.

c) Capital investment.

d) Means of finance.

e) Profit loss account statement.

OR

Q6) a) Write the need and importance of labor laws. **[4]**

b) What are the factors influencing working capital requirements? **[6]**

c) Explain in detail Workman's compensation Act 1923. **[6]**

SECTION - II

Q7) a) Write the role of insurance in risk management. **[8]**

b) Explain the concept of value engineering in the context of building construction project. **[10]**

OR

Q8) a) Write the concept of value and detail steps in value analysis. **[8]**

b) Explain following terms : **[10]**

i) Break even analysis.

ii) Decision tree analysis.

Q9) a) Define Supply Chain Management (SCM). Explain SCM in context with construction materials management. **[8]**

b) Explain the concept of performance appraisal and job evaluation. **[8]**

OR

Q10) a) Write down functions of materials management and explain in detail. **[8]**

b) Describe the human resource management process with suitable example. **[8]**

Q11) a) What are the applications of Artificial Neural networks in construction management? **[8]**

b) Discuss the concept of Genetic algorithm. **[8]**

OR

Q12) a) What do you understand by Artificial Intelligence? And write its applications in construction management? **[8]**

b) Write short note on the following: **[8]**

i) Analogy between Biological neuron and Artificial neuron.

ii) Fuzzy logic.

Total No. of Questions : 12]

SEAT No. :

P2984

[Total No. of Pages : 3

[5354]-200
B.E. (I.T.)
MULTIMEDIA SYSTEMS (Elective - II)
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to section I and section II should be written in separate answer sheets***
2) ***Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6,from section I***
3) ***Answer Q.No. 7 or Q.No. 8, Qno 9 or Qno 10,or Qno 11 or Qno 12 from section - II***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of non programmable calculator is allowed.***
7) ***Assume suitable data, if necessary***

SECTION - I

Q1) a) List the characteristics and five applications of multimedia system **[9]**

b) What is Multimedia document & multimedia document architecture? Explain open document (ODA) and open media framework (OMF) in details. **[9]**

OR

Q2) a) Explain any two software tools available for carrying out multimedia task. **[8]**

b) What is the role of multimedia in internet? What are the multimedia building blocks? **[10]**

Q3) a) Explain TIFF and BMP file format in detail **[8]**

b) Document contains letters A through F with frequencies as indicated; Use Huffman coding to derive a codeword set. **[8]**

Letters	A	B	C	D	E	F
Frequencies	0.2	0.17	0.28	0.15	0.36	0.04

OR

P.T.O.

Q4) a) What is a vector Length Coding? Explain Shannon-fano algorithm with suitable example. **[8]**

b) Write a short note on **[8]**

i) Lossless v/s Lossy compression.

ii) Intra-frame v/s inter-frame compression.

Q5) a) State and explain any four important parameters of digital audio. **[8]**

b) Explain MIDI in detail. **[8]**

OR

Q6) a) Explain DM & ADPCM Audio Compression Technique. **[8]**

b) Explain Psycho-acoustics in detail. **[8]**

SECTION - II

Q7) a) Explain any three digital video transmission standard. **[9]**

b) Write a short note on **[9]**

i) H-261 and H-263

ii) Cine pack.

iii) Nero digital.

OR

Q8) a) Elaborate the following in short **[9]**

i) S-VHS and VHS-C

ii) Micro-MV and DVCAM

iii) Video compact cassette (VCC) and Video cassette recorder (VCR).

b) Explain video home system (VHS) in detail. Also comment on its improved version. **[9]**

Q9) a) What is virtual reality? What are its different forms? Elaborate in brief **[8]**

b) What is VRML? What is the objective behind the introduction of VRML? **[8]**

OR

Q10)a) Explain any one virtual reality application. **[8]**

b) List all virtual reality devices and explain any in detail. **[8]**

Q11)a) Explain two techniques of animation **[8]**

b) Write a short note on **[8]**

i) 3D animation

ii) Animation on the web

OR

Q12)a) Explain creation of animation using Flash with suitable example **[8]**

b) Elaborate any four principles of animation. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2985

[Total No. of Pages : 3

[5354]-201
B.E. (Information Technology)
DISTRIBUTED SYSTEMS
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from section - I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from section - II.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary***

SECTION - I

Q1) a) What is middleware? Explain it with one example. **[9]**

b) Describe in details the different design issues in Distributed System. **[9]**

OR

Q2) a) Explain the issues of transparency in Distributed System. **[10]**

b) Describe the key characteristics that are primarily responsible for the usefulness of Distributed System. **[8]**

Q3) a) What is the difference between connection-oriented socket and connection-less socket? Give one example of each. **[8]**

b) Discuss the challenges of scalability while designing Distributed System. **[8]**

OR

Q4) a) Write a note on Multi-tier architecture and explain client-server architecture. **[8]**

b) Explain following in details with respect to message buffering: **[8]**

i) Null Buffering
ii) Single-message buffer
iii) Unbound-capacity Buffer
iv) Multiple Message buffer.

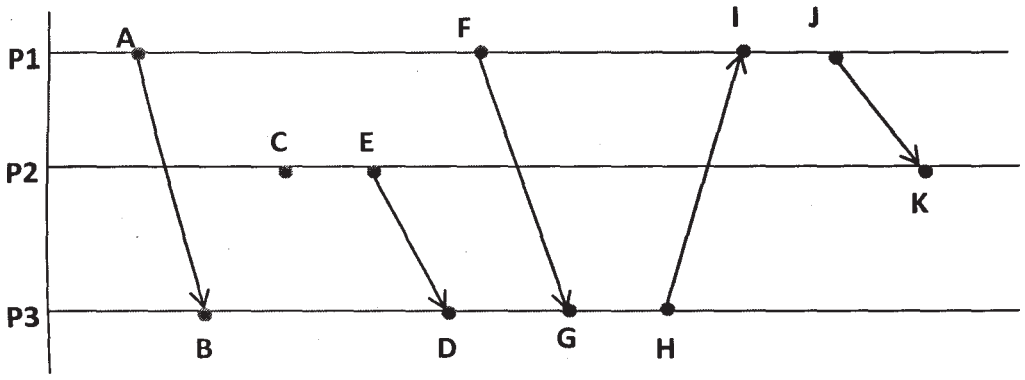
P.T.O.

Q5) a) What is CORBA? Describe the general organization of CORBA system with help of a neat diagram. **[8]**

b) Explain RMI call Semantics in detail. **[8]**

OR

Q6) a) Solve following timing diagram using Lamport's Logical clock and Vector Time-stamp method. **[8]**



b) Why clock synchronization is required in distributed system? **[8]**

SECTION - II

Q7) a) Explain CODA File System Architecture with a diagram in detail. **[8]**

b) Write a short note on : **[8]**

i) Security in Network File System

ii) X.500 directory service

OR

Q8) a) How communication does takes place in Coda? Describe the implementation and resolution of code file identifier? **[8]**

b) List and explain characteristics of a good distributed system? **[8]**

Q9) a) What is Distributed Shared Memory? List and explain its challenges. **[8]**

b) What are data centric consistency model? Explain in detail. **[8]**

OR

Q10)a) Discuss how the efficiency of Distributed Shared Memory system depends on the size of granularity and protocol used for page replacement. **[8]**

b) Explain different approaches for replication management. **[8]**

Q11)a) Shows that Byzantine agreement cannot always be reached among four processors of two processors are fault. **[8]**

b) Why commit protocols are required? Explain 2 Phase Commit and 3 Phase Commit Protocol with their differences. **[10]**

OR

Q12)a) Consider a web browser that returns outdated cached pages instead of a more recent one that had been updated at the server. Is this a failure, and if so what kind of failure? **[8]**

b) What is multicasting? Explain basic multicasting? How it can be scalable? **[10]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2986

[Total No. of Pages : 3

[5354]-202
B.E. (Semester - I)
INFORMATION TECHNOLOGY
Information Retrieval
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Explain Luhn's idea of Index Term Weighting. **[6]**

b) Give difference between Data Retrieval and Information Retrieval. **[6]**

c) Explain in detail various parameters used while designing any clustering algorithm. **[6]**

OR

Q2) a) How to generate Document Representatives using Conflation Algorithm. **[8]**

b) Enlist the Algorithms used for Clustering and Explain Single Pass Algorithm. **[8]**

c) State Zipf's Law. **[2]**

Q3) a) Explain Cellular multi-lists with proper example. **[8]**

b) Explain Vector Model along with its advantages. **[8]**

OR

Q4) a) What do you mean by Coordination level? For the following query what If for the following Ki list the set of documents are: **[6]**

K1-list: Dl, D2, D3, D4
K2-List: Dl, D2
K3-List: Dl, D2, D3
K4-List: Dl
Then query Q= K1 AND K2 AND K3 find out the ranking

P.T.O.

b) Explain Sequential files and their Advantages and Disadvantages in detail. **[6]**

c) Write note on: Suffix Array. **[4]**

Q5) a) Explain the terms Precision and Recall **[10]**

Assume the following:

- A database contains 80 records on a particular topic
- A search was conducted on that topic and 60 records were retrieved.
- Of the 60 records retrieved, 45 were relevant.

Calculate the precision and recall scores for the search.

b) Write note on : OPAC. **[6]**

OR

Q6) a) Discuss the architectural issues in Digital library. **[8]**

b) Explain Alternative Measures in detail. **[8]**

SECTION - II

Q7) a) Describe Ontology in Information retrieval and its use? **[8]**

b) Explain distributed IR with the help source selection and Query Processing. **[8]**

OR

Q8) a) With respect to various aspects discuss MIMD Architectures. **[8]**

b) Define Ontology? Explain in detail reasons to develop Ontology. **[8]**

Q9) a) What is the role of Multimedia in Commercial Database Management System? **[8]**

b) Discuss MULTOS in short. **[8]**

OR

Q10)a) Write note on Generic Multimedia Indexing Approach (GEMINI)? **[8]**

b) Discuss SQL3 in short. **[8]**

Q11)a) Discuss the centralized architecture of the search engine; Enlist the drawbacks of Harvest architecture. **[12]**

b) What do you mean by Web crawler and briefly explain the working of web crawler. **[6]**

OR

Q12)a) Write short notes on: Challenges in web search. **[6]**

b) What is Web Structure mining. **[6]**

c) Explain Meta searches with example. **[6]**

Total No. of Questions : 12]

SEAT No. :

P2987

[Total No. of Pages : 3

[5354]-203
B.E. (Information Technology)
REAL TIME SYSTEM
(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) What is Hierarchical View of Performance measure of RTS? In what way it is different than traditional Measure of performance? **[8]**

b) List down the types of performance measures for real-time systems. Which performance measures are the most appropriate for real-time systems? Why? **[8]**

OR

Q2) a) How can engineers estimate the worst-case run time of a program, given the source code and target architecture? Draw and explain Schematic of a timing estimation system. **[8]**

b) Explain different issues in real time computing. Draw block diagram for real time computer. Explain various characteristics of Real Time System. **[8]**

Q3) a) List down the suitable assumption for preemptive Earliest Deadline First Algorithm. In what way preemptive Earliest Deadline First Algorithm is different than Deadline Monotonic Algorithm. **[10]**

b) Describe the priority inheritance protocol. Give an example to show how this protocol can lead to deadlock. **[8]**

P.T.O.

OR

Q4) a) Consider : Task 1 = (pl,el) = (2,0.9) **[10]**
Task 2 = (p2,e2) = (5,2.3)
i) Find total processor utilization
ii) Find necessary and sufficient condition

b) How are mode change implemented when the priority ceiling protocol is used to handle the access to critical section. **[8]**

Q5) a) Using example explains the different data typing features that could be useful in a real time programming language. **[6]**

b) Describe the skeleton and optimistic algorithm under the two phase approach to improve predictability of real time transaction. **[10]**

OR

Q6) a) Explain how the two phase locking approach used in pessimistic concurrency control is disadvantage to real time system. How can it be modified to overcome the problem? **[10]**

b) Using example explain the different data typing features that could be useful in a real time programming language. **[6]**

SECTION - II

Q7) a) Explain Virtual Time Carrier Sensed Multiple Access (VTCSMA) algorithms with flow chart. **[4]**

b) Draw the operational models for resources reservation protocol and explain briefly. **[10]**

c) What is Timed Token protocol? How it is implemented. **[4]**

OR

Q8) a) Write a short notes on(Any Two) : **[10]**
i) Hard Real Time Databases
ii) Disk Scheduling Algorithms
iii) Maintaining serialization consistency

b) Discuss the various communication medium used in real time networking. **[8]**

Q9) a) List and explain the capabilities of RTOS. **[8]**

b) List down the types of POSIX stands. Explain the requirement of POSIX- RTstandard. **[8]**

OR

Q10)a) Draw the block diagram of task management services. Explain the functionality of RTOS Kernals. **[10]**

b) Explain in detail and draw the block diagram of RT Linux. **[6]**

Q11)a) How is hardware redundancy implemented through voting and consensus? Explain the working of formalized majority vote. **[8]**

b) How the fault types are classified? Discuss output behavior classification. **[8]**

OR

Q12)a) Explain briefly fault detection method using fault and error containment. **[8]**

b) Explain the Byzantines algorithm for fault tolerance with an example. Also specify the interactive consistency condition. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2988

[Total No. of Pages : 3

[5354]-204

B.E. (Information Technology)

SOFTWARE ARCHITECTURE

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three Questions from Section - I and three Questions from Section - II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Make suitable assumptions wherever relevant and appropriate.***

SECTION - I

Q1) a) Define the given term/concept and give examples **[10]**

i) Software architecture

ii) Stakeholders in architecture.

b) Write short note on documenting software architecture. **[8]**

OR

Q2) a) How Architectures are influences by stakeholders? **[10]**

b) Explain with suitable example: **[8]**

i) Architecture is high-level design.

ii) Architecture is the overall structure of the system.

iii) Behavior of each software element is part of the architecture.

iv) Architecture has component & connectors.

Q3) a) Explain Templates for documenting interfaces. **[8]**

b) Following concern in context of modifiability: "when is a change made and who makes it". **[8]**

OR

P.T.O.

Q4) a) Write short note on following: **[8]**

i) Modifiability Tactics

ii) Security Tactics

b) What is Quality Attributes? Explain quality attributes of web application? **[8]**

Q5) a) Describe Abstract Factory pattern with respect to intent, application and solution. **[8]**

b) What are design patterns, why do we need them, give an example design pattern? **[8]**

OR

Q6) a) How observer pattern can be used to design a digital and an analog clock. Explain with the structure and behavior? **[8]**

b) Write a short note on Model View Controller (MVC) and its application? **[8]**

SECTION - II

Q7) a) Compare Different architecture styles. **[10]**

b) Write short note on following: **[8]**

i) Coupling in XML.

ii) Structure of XML.

OR

Q8) a) Explain three tire architecture with reference with to presentation, business and persistence layers. **[10]**

b) Write short note on following: **[8]**

i) Coupling in XML.

ii) Structure of XML.

Q9) a) Explain EJB Architecture in detail. Describe entity, Session and Message beans in detail. **[8]**

b) Write short note on following: **[8]**

i) JSP

ii) JSF

OR

Q10)a) Explain with example: **[8]**

i) Entity Beans

ii) Session Beans

b) Explain with example: **[8]**

i) CGI

ii) Application Server

Q11)a) Write Short note on: **[8]**

i) Components and Interfaces

ii) Dynamic Link Library

b) What kind of responsibilities does a web client have? How can one make web client more dynamic. **[8]**

OR

Q12)a) Describe .NET Architecture. What is role of CLR, CLS, CTS and CLI in it? **[8]**

b) Write short note on following: **[8]**

i) .NET web services

ii) Legacy Application

Total No. of Questions : 12]

SEAT No. :

P2989

[Total No. of Pages : 3

[5354]-205

B.E. (Information Technology)

ADVANCED GRAPHICS

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Figure to the right indicates full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the issues related to three dimensional display methods. Compare parallel projection and perspective projection method for 3-D objects. **[10]**

b) In parametric representation of curves, there are methods by which curves can be represented. Define and compare any two of the following: **[8]**

i) Bezier curve
ii) B-Spline curve
iii) NURBS (Non-Uniform Rational B-Spline)

OR

Q2) a) Develop a general form of a B-Spline blending functions of degree 3. **[10]**

b) Explain the working methodology of NURBS (Non-Uniform Rational B-Spline). **[8]**

Q3) a) Define Animation. Enlist its applications. Explain various methods of controlling animations. **[8]**

b) What are the main categories of animation tools? Name any four animation tools in each main category and explain with examples. **[8]**

P.T.O.

OR

Q4) a) Explain the basic rules of animation. Differentiate between frame-by-frame animation technique and real-time animation technique. **[8]**

b) What is meant by Animation Language? Explain the types of animation languages with appropriate examples. **[8]**

Q5) a) Discuss various methods used for modeling solids. **[8]**

b) Give the significance of user interfaces for solid modeling. Discuss various ways to achieve this. **[8]**

OR

Q6) a) Write a short note on following: **[8]**

i) Constructive solid modeling

ii) Spatial partitioning representations

b) Discuss the significance of sweep representations and how it works. **[8]**

SECTION - II

Q7) a) Derive the simple illumination model. Include the contribution of Diffuse, ambient and specular reflection. **[10]**

b) Explain the conversion of RGB model to CMY model and CMY model to RGB model. **[8]**

OR

Q8) a) What is the difference between Y in CMY and Y in YIQ colour model? Write a note on HSV color model. **[10]**

b) Discuss in brief the conversion of RGB model to YIQ model and YIQ model to RGB model. **[8]**

Q9) a) Explain surface rendering and polygon surfaces in detail. **[8]**

b) Discuss the Beam tracing and Pencil tracing methods. **[8]**

OR

Q10)a) Derive the simple illumination model. Include the contribution of Diffuse, ambient and specular reflection. **[8]**

b) Explain in detail Quadtrees and Octrees. **[8]**

Q11)a) What is meant by Virtual Reality? Describe any two special devices that are used for man machine interaction in virtual reality systems. **[8]**

b) Discuss Phong shading method. How it is different from flat shading. **[8]**

OR

Q12)a) What is Virtual Reality Modeling Language? What are the types of Virtual Reality? **[8]**

b) Discuss Gouraud shading model. Enlist its merits and demerits. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2990

[Total No. of Pages : 2

[5354]-206

B.E. (Information Technology)

ADVANCED COMPUTER NETWORKS

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q.1 or 2, Q.3 or 4, Q.5 or 6, Q.7 or 8, Q.9 or 10, Q.11 or 12.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) What is network principle? What are network services in Layered architecture? Explain. **[10]**

b) Explain ATM and cell phone. **[8]**

OR

Q2) a) List logical layers of OSI model and explain that in detail. **[12]**

b) What are different principles of network design? **[6]**

Q3) a) Illustrate architecture of wireless communication. **[8]**

b) Draw figure of WDM system in Optical Networks. **[8]**

OR

Q4) a) Show the fields of ATM header. Explain. **[8]**

b) Write mobility management issues in wireless networks. **[8]**

Q5) a) How congestion is controlled in ATM network. **[6]**

b) Explain M/M/1 and M/M/2 queue w.r.t. Marcov Chain Models? **[10]**

OR

P.T.O.

Q6) a) State and explain in brief QoS parameters. **[8]**

b) What are techniques used to control Congestion? **[8]**

SECTION - II

Q7) a) State formats of BGP messages. **[10]**

b) What is VPN? State significance of tunneling in VPN. **[8]**

OR

Q8) a) Describe with the example RIP. **[8]**

b) Describe Traffic Engineering concept in MPLS. **[10]**

Q9) a) What is RSVP? Explain. **[8]**

b) List IPv6 API and explain it in detail. **[8]**

OR

Q10)a) What are Mobile IP characteristics? **[8]**

b) What are the features of IPv6? **[8]**

Q11)a) State the process of firewall implementation in a network? **[8]**

b) Why overlay networks are important? Explain. **[8]**

OR

Q12)a) Explain any one architecture of ad-hoc networks. **[8]**

b) Define ad-hoc network along with its limitations. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2991

[Total No. of Pages : 3

[5354]-207

B.E. (Information Technology)

BIO-INFORMATICS

(2008 Pattern) (Semester - II) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from Section - I & three questions from Section - II.***
2) ***Answer should written in two separate books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Assume Suitable data, if necessary.***

SECTION - I

Q1) a) What are different molecular & bio-informatics techniques. **[8]**

b) What is Bio-informatics? Enlist application. **[8]**

OR

Q2) a) What is Baye's rule? Explain Baye's theorem applicable in biological system. **[6]**

b) Explain the working of Central Dogma of molecular biology with neat diagram. **[10]**

Q3) a) List different computational methods of sequence alignment and discuss any two in detail. **[8]**

b) What is clustering? Explain two methods of clustering of gene expression data. **[8]**

OR

Q4) a) Describe the adv. of clustering techniques in computational molecular biology. **[10]**

b) What is the role of microarray in bioinformatics **[6]**

P.T.O.

Q5) a) What is data mining explain data mining applications in genomic sequences. **[10]**

b) Explain various representation of nucleotide sequences along with their particular uses and application. **[8]**

OR

Q6) a) Explain methods of computational sequence alignment **[10]**

i) Substitution matrices

ii) Word method

b) Enlist different tools for pattern matching **[8]**

SECTION - II

Q7) a) What is drug discovery? Explain various steps of drug discovery **[10]**

b) Explain the comparative modeling process of protein structure prediction. Discuss all the phases in detail **[8]**

OR

Q8) a) What are the components involved in modeling & simulation system. **[8]**

b) Explain the basic modeling & simulation process in regards to bioinformatics with neat diagram **[10]**

Q9) a) Application of PSI blast. **[8]**

b) Differentiate in the approach of BLAST & FASTA **[8]**

OR

Q10)a) Explain BLAST algorithm **[8]**

b) Explain FASTA algorithm. What FASTA programs available for sequences **[8]**

Q11)a) Explain application of genetic Engineering **[8]**

b) Write significance of Biotechnology **[8]**

OR

Q12)a) Define Genetic Engineering (GE). What is Gemurker? What are danger of GE **[8]**

b) Write short note on HMM & Neural Network **[8]**

Total No. of Questions : 12]

SEAT No. :

P2992

[Total No. of Pages : 3

[5354]-208

B.E. (Information Technology)

NEURAL NETWORK AND EXPERT SYSTEMS

(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer-books.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare the performance of a computer and that of a biological neural network in terms of speed of processing, size and complexity, storage, fault tolerance and control mechanism. **[12]**

b) Explain the limitations of Biological Neuron. **[5]**

OR

Q2) a) With neat diagram explain basic architectures of neural networks. **[8]**

b) Write the equation which describes the operation of the perception model of a neuron. **[9]**

Q3) a) What is conjugate gradient method? Comment on the performance of the conjugate- gradient method? **[9]**

b) What do you understand by the following terminologies? **[8]**

i) Nearest neighbor recall and interpolative recall.

ii) Fixed point stability, oscillatory stability and chaotic stability.

OR

P.T.O.

Q4) a) Demonstrate with algorithmic steps and formulations EBP algorithm on MLFFNN. **[8]**

b) Comment on the performance issues of EBP. **[9]**

Q5) a) Explain how Support Vector Machine is used for pattern regression? **[8]**

b) In What way Relevance Vector Machines differs from SVM? Comment. **[8]**

OR

Q6) a) What is purpose of "Regularization"? List types of Regularizations. **[10]**

b) What do you understand by "Kernel trick" in SVM? **[6]**

SECTION - II

Q7) a) What are the salient features of Kohonen's self-organizing learning algorithm. **[9]**

b) Explain with Diagram i) Pattern Clustering and ii) Pattern Grouping **[8]**

OR

Q8) a) What do you understand by the following **[9]**

i) Thermal Equilibrium

ii) Simulated Annealing

b) Explain with neat diagram "Recurrent Neural Networks" **[8]**

Q9) a) What are the advantages in keeping knowledge base separate from control module in knowledge based system? **[8]**

b) Identify and describe an application area to design an Expert System. **[8]**

OR

Q10)a) Explain with neat diagram blackboard system architecture and its components. **[8]**

b) What is uncertainty? Explain two approaches that deal with uncertainty problem. **[8]**

Q11)a) List and explain Expert system building tools. **[9]**

b) Write a short note on DENTRYL. **[8]**

OR

Q12)a) What do you mean by knowledge Engineering? Explain various stages of knowledge acquisition. **[9]**

b) Write a short note on E- MYCIN. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2993

[Total No. of Pages : 2

[5354]-209
B.E. (Information Technology)
GEO INFORMATICS SYSTEM
(2008 Pattern) (Elective - IV) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Image Interpretation strategy? **[9]**

b) Explain Spatial filtering Techniques in detail? **[9]**

OR

Q2) a) Explain the different pre-processing method in detail. **[9]**

b) Enlist the details that are annotated on the satellite imagery. Explain the sub-processes involved in image interpretation. **[9]**

Q3) a) Explain the electromagnetic remote sensing process with diagram? **[8]**

b) Describe IRS series of satellites? **[8]**

OR

Q4) a) Explain the radar principal with required formula? What are the factors Affecting microwave? **[8]**

b) What are different sensor parameter? Describe them with example. **[8]**

Q5) a) Explain different types of scale representation. **[8]**

b) Describe the workflow process of GIS. **[8]**

OR

P.T.O.

Q6) a) Explain the process of linkage of GIS to remote sensing. **[8]**

b) What is Map Projection? Describe different types of map projection. **[8]**

SECTION - II

Q7) a) Explain conversion of existing geo data? **[8]**

b) What are the sources of errors in GIS? **[8]**

OR

Q8) a) Explain the accuracy, precision and resolution as quality factors of GIS Data? **[8]**

b) Write short notes on (any two): **[8]**

i) RMS error

ii) Location error

iii) Topological error

Q9) a) Explain the basic elements of GIS modeling? **[9]**

b) What is vector data representation? Explain it with suitable example? **[9]**

OR

Q10)a) What is raster data representation .Explain it with suitable example? **[9]**

b) What are different techniques of graphic representation of spatial data? **[9]**

Q11)a) Describe different application of GIS? **[8]**

b) Explain the software scenario in GIS focusing on functionalities, product and developers? **[8]**

OR

Q12)a) Explain the issues and trends in GIS development? **[8]**

b) How GIS can help to face a challenge of urbanization in metro cities? **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2835

[Total No. of Pages : 3

[5354] - 21

B.E. (Civil) (Semester - II)

INTEGRATED WATER RESOURCES & PLANNING

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers any three questions from each section.***
2) ***Answers to the two sections should be written in separate ansswer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Write a short note on scope for privatization in the field of water resources. **[4]**

b) What is Integrated Water Resource Management? State and explain necessity of IWRM. **[6]**

c) What is the role of National Water Laws? Explain any 3 laws in detail. **[8]**

OR

Q2) a) What are riparian rights? Explain any two. **[4]**

b) What are the different water resources in India? Write appropriate steps for developing these resources. **[6]**

c) What is 'Cost-Benefit Analysis'? Explain it in detail with two suitable examples. **[8]**

P.T.O.

Q3) a) The runoff of stream in the month of October has mean and standard deviation of 165 and 200 cumec-months respectively. Assuming that lognormal distribution is a good fit. Find the probability that October runoff in the stream in any year exceeds 185 cumec months. What is the probability that the October runoff would fall in the range 100 to 250 cumec months? **[10]**

b) Distinguish between probability density function and probability distribution function. **[6]**

OR

Q4) a) Write short note on : Application of ANN in flood routing as well as flood prediction with suitable examples (two examples for each category). **[8]**

b) Define correlation and regression. What is difference between correlation coefficient and regression coefficient? What is the relation between them? **[8]**

Q5) a) What is the use of geoinformatics in drought monitoring? Explain with two suitable examples. **[8]**

b) Distinguish between the mitigation plans of flood management and drought management. **[8]**

OR

Q6) a) Explain the use of geoinformatics in flood management. **[8]**

b) What are different types of Drought? Explain severity index of drought with suitable examples in India. **[8]**

SECTION - II

Q7) a) Explain the concept of basin scale hydrology related to estimation of surface water. **[8]**

b) What are Consumptive & non consumptive demands of water and its effect on the 'demand and supply based management system' of water resources? **[8]**

OR

Q8) a) What is 'Inter Basin Water Transfer', enumerate it with suitable example. **[8]**

b) Write a short note on Aquaculture. **[8]**

Q9) a) Correlate direct and indirect benefits of water resource development to employment generation. **[8]**

b) Explain the impact of water resources development on the management of rehabilitation & resettlement. **[8]**

OR

Q10) a) Explain 'Co-operative movement in the water resource development' with the help of case study. **[8]**

b) Explain how the social impact of water resource development is related to agro-industry? **[8]**

Q11) a) What is Decision Support System for Integrated Water Resource and Planning? Explain its necessity? Enumerate the criteria for DSS to be used in different conditions. **[10]**

b) Explain the concept of perspective plan for basin development and management. **[8]**

OR

Q12) a) Explain applications of Artificial Neural Network in water resource planning and development. **[10]**

b) What is the role of geoinformatics in basin planning and management? **[8]**

Total No. of Questions : 12]

SEAT No. :

P2994

[Total No. of Pages : 2

[5354]-210
B.E. (IT)
BUSINESS INTELLIGENCE
(2008 Pattern) (Open Elective)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Draw neat diagrams wherever necessary.***
2) ***Assume suitable data, if necessary.***
3) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Explain how data warehouse is different from databases. What care should be taken while implementing data warehouses? **[8]**

b) Compare OLAP and OLTP. **[8]**

OR

Q2) a) Describe the architecture of data warehouse. **[8]**

b) Discuss one application of each: OLAP and OLTP. **[8]**

Q3) a) Draw a diagram to depict star, snowflakes and galaxy (fact constellation). **[8]**

b) Explain parent-child and many-many relationship. **[8]**

OR

Q4) a) What are facts and dimensions? **[8]**

b) Explain different types of SCDs with the help of examples. **[8]**

Q5) a) Explain different processes in ETL. **[9]**

b) Explain the term loading. What is initial and incremental loading? Are these similar to database loading? **[9]**

P.T.O.

OR

Q6) a) What are metadata, data cubes and marts? **[9]**

b) Explain architecture of ETL. **[9]**

SECTION - II

Q7) a) Explain presentation layer and data layer. **[8]**

b) What is data aggregation? Is it a mandatory step? Explain. **[8]**

OR

Q8) a) Explain the operations- drill down, drill up, slicing and dicing. **[8]**

b) Explain various report elements. **[8]**

Q9) a) What is the difference between classification and regression? **[9]**

b) Write a note on text mining. **[9]**

OR

Q10)a) What are supervised algorithms? Why is decision tree a supervised algorithm? Explain decision trees. **[9]**

b) What is cluster analysis? Explain working of k-means algorithm. **[9]**

Q11)Write a note on HIVE, PIG and Netezza. **[16]**

OR

Q12)a) Write a note on Teradata. **[8]**

b) Write a note on agile BI. **[8]**

Total No. of Questions : 7]

SEAT No. :

P2995

[Total No. of Pages : 3

[5354]-211
B.E. (Chemical)
PROCESS DYNAMICS & CONTROL
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Attempt following questions **[16]**

Develop the model equations of a stirred tank heater system heated with an electrical heater coil supplying heat 'Q' to the liquid in the tank. Derive the transfer function of the heater relating the system temperature T to the feed temperature T_i and coil heat rate 'Q', assuming constant volume.

OR

Q2) a) Solve the following differential equation using Laplace and inverse Laplace transformations, $\frac{d^2y}{dt^2}+\frac{dy}{dt}+2y=2$ **[10]**

to find the time response equation, subject to initial conditions:

y(0) = y'(0) = 0

b) Describe the initial-value, final-value and time-shift theorems of Laplace transformations. **[6]**

Q3) a) Derive transfer function of servo problem for negative feedback control system. **[8]**

b) Derive transfer function two-tank liquid level non-interacting system. **[8]**

OR

P.T.O.

Q4) A first-order process is controlled by a PD-controller. Determine the following, assuming $G_m = G_f = 1$ **[16]**

i) Overall closed-loop transfer function
ii) Order of the closed-loop system
iii) Offset equation for a unit step input in $Y_{sp}(s)$
iv) Overall gain of the closed-loop system.

Q5) a) Check the stability of the closed loop system with the following transfer function, $CE = s^4 + 4s^3 + 6s^2 + 2s + 3 = 0$ **[10]**

b) What is root locus diagram and how is it used to find stability of a system? **[8]**

Q6) Draw the root locus of the system with the following transfer function, **[18]**

$$G(s) = \frac{12K_c(s+0.5)}{(s+1)(s+2)(s+3)}$$

Mention all the steps and comment on the stability of the system.

SECTION - II

Q7) a) Explain gain margin and phase margin in context of Bode diagram of a system and find the K_c value for a P-controller for a system with, **[10]**

$$G_{OL}(s) = \frac{1}{(3s+1)(s+1)(5s+1)}$$

for the gain margin of 1.5, where the cross-over frequency is 0.78

b) Explain controller tuning by Zieglar-Nichols PID controller settings.**[6]**

OR

Q8) Sketch the Bode plots of the following system, mentioning each step in detail,**[16]**

$$G(s) = \frac{(2s+1)}{(4s+1)(s+1)}$$

Q9) a) Explain feed-forward control of a three tank composition control system with a neat process diagram. **[8]**

b) What is Smith predictor control system? Explain with the block diagram.**[8]**

OR

Q10)a) Explain the override control system for a compressor with a neat diagram.**[8]**

b) Explain split-range control system with a suitable example. **[8]**

Q11) Write short notes on:

i) Programmable logic controllers and their applications (PLC). **[9]**

ii) Supervisory control and data acquisition systems (SCADA). **[9]**

OR

Q12) a) Explain the Direct Digital Control (DDC) system through a neat block diagram. **[9]**

b) Explain the use and working of an hold element in a digital control loop. Give the equations of a zero-order and first-order hold elements. **[9]**

Total No. of Questions : 12]

SEAT No. :

P2996

[Total No. of Pages : 3

[5354]-212
B.E. (Chemical Engineering)
CHEMICAL REACTION ENGINEERING - II
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier Charts, Electronic pocket calculator and steam table is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Derive the equations for combined linear and non linear rates in. case of heterogeneous reactions. **[9]**

b) Derive the expression for relation between fractional conversion and time in case of Diffusion through ash layer controls. **[9]**

OR

Q2) a) Two small samples of solids are introduced into a constant environment oven and kept there for 1 hr under these conditions the 4 mm particles are 58% converted, 2 mm particles are 87.5% converted. Find the rate controlling mechanism for the conversion of solids. Also find the time needed for complete conversion of 1 mm particles in this oven. **[8]**

b) What do you mean by Elutriation velocity constant? How it is applicable in calculation of mean residence time for fluidized bed with entrainment of solids? **[10]**

Q3) a) Explain the various kinetic regimes for mass transfer and reaction. **[8]**

b) Give step wise procedure and derive the expression for rate for slurry reaction kinetics. **[8]**

OR

P.T.O.

Q4) a) Derive the expression for height of tower in case of mass transfer with reaction. **[10]**

b) Derive the expression for height of the tower for slow reactions. **[6]**

Q5) a) Explain the preparation methods of catalyst in detail. **[8]**

b) Explain determination of surface area of catalyst using the BET method. **[8]**

OR

Q6) a) Explain catalyst poisoning and regeneration and catalyst in detail. **[8]**

b) Discuss adsorption isotherms which are widely used in catalytic reactions in detail. **[8]**

SECTION - II

Q7) a) Explain diffusion in porous catalysts with the help of suitable sketch. **[8]**

b) Explain and derive an expression for effectiveness factor. **[8]**

OR

Q8) a) Explain in detail experimental and calculated effectiveness factor. **[8]**

b) Derive an expression for gaseous diffusion in single cylindrical pores of catalyst. **[8]**

Q9) The catalytic reaction $A \rightarrow 4R$ is studied in a plug flow reactor using various amounts of catalyst and 20 liter/hr of pure A feed at 3.2 atm and 117 °C. The concentration of A in the effluent stream is recorded for the various runs as follows **[16]**

Run	1	2	3	4	5
Catalyst used, kg	0.020	0.040	0.080	0.120	0.160
$C_{A,\ out,}$ mol/lit	0.074	0.060	0.044	0.035	0.029

Find a rate equation to represent this reaction using integral method of analysis with following data

$C_{A0} = 0.1$ mol/lit, $F_{A0} = 2$ mol/hr, $\varepsilon_A = 3$

OR

Q10)a) What are the various methods for finding rates in case of solid catalyzed reactions? Explain each in detail. **[8]**

b) What are the various controlling resistances to find rate of solid catalyzed reactions. **[8]**

Q11)a) Explain the design procedures of staged adiabatic reactor. **[9]**

b) Explain in detail working procedure of fermentor. **[9]**

OR

Q12)a) Explain in detail design of slurry reactor. **[9]**

b) Explain enzyme catalyzed reactions with help of any example. **[9]**

Total No. of Questions : 12]

SEAT No. :

P2997

[Total No. of Pages : 4

[5354]-213
B.E.
CHEMICAL ENGINEERING DESIGN - II
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) Design a jacketed vessel with plain jacket with the following specifications: **[12]**

Vessel internal diameter	2130 mm
Jacket internal Diameter	2260 mm
Jacket Length	2500 mm
Diameter of half coil or width of channel jacket	100 mm
Flanged and Dished head:	
Internal Diameter	2130 mm
Crown Radius	2130 mm
Knuckle Radius	128 mm
Straight Flange Length	60 mm
Internal Shell Pressure	0.55 N/mm^2
Internal Pressure Jacket	0.35 N/mm^2
Temperature	150°C
Material — Open Hearth Steel (15 - 200°C)	
Allowable stress	98N/mm^2
Modulus of Elasticity	$190 \times 10^3 N/mm^2$
Poisson's Ratio	0.3

b) Explain the classification of reaction vessels **[4]**

P.T.O.

OR

Q2) a) Calculate the diameter of shaft for an agitation system. Power required for agitation is 3HP and speed of rotation is 56 rpm. Impeller diameter is 65 cm. Maximum torque is 18900 kg-m while bending moment is 27700 kg-m Permissible shear stress = 400 kg/cm^2, Permissible tensile stress = 600 kg/cm^2 **[8]**

b) With neat sketches describe vortex and swirling and methods to avoid it. **[8]**

Q3) a) Find out the plate pressure drop and check the downcomer back up for the column with the help of following data: Diameter of column = 0.79 m, Area of column = 0.5 m^2, Volumetric flow rate of vapour = 1.13m^3/s, Orifice coefficient = 0.84, Density of vapour = 0.70 kg/m^3, Density of liquid = 950 kg/m^3, Weir height = 50 mm,Weir length = 0.6 m, Hole diameter = 5mm, Plate thickness = 5 mm, Height of overflow weir = 27 mm, Maximum liquid rate = 4.06 kg/s. **[10]**

b) What are the different design methods for binary systems? Explain any one in detail. **[8]**

OR

Q4) a) What are the various types of areas used for design of plate column? How these areas are decided? **[6]**

b) Explain a sieve plate performance diagram. **[6]**

c) Draw neat sketches of the following: **[6]**

i) Liquid flow patterns on cross flow trays.

ii) Types of downcomers

Q5) a) A feed containing 45% more volatile component enters a packed bed. The distillate from the packed bed contains 95% more volatile component and bottom product contains 10% more voltile component. Relative volatility of the mixture is 3.0. A total condenser is used and the tower is operated with a reflux ratio of 1 .25 times the minimum reflux ratio. The height of transfer unit values for rectifying section are $H_y = 0.5$, $H_x = 1.0$ Mass transfer coefficient is constant across the column. Determine the flow rates, steam consumption and packing height required to achieve the separation. **[10]**

b) Explain random packings and structured packings. **[6]**

OR

Q6) a) Explain in detail Onda's method for prediction of HTU. Give the necessary equation. **[8]**

b) Give advantages of plate column over packed column. **[8]**

SECTION - II

Q7) a) Design a decanter to separate light oil from water. The oil is the dispersed phase. **[10]**

Oil – Flow rate = 1,000 kg/h, Density = 900 kg/m^3, Viscosity = 3 mNs/m^2

Water - Flow rate = 5,000 kg/ h, Density = 1,000 kg/m^3, Viscosity = 1 mNs/m^2 Droplet diameter = 150 μm.

b) Write notes on **[8]**

i) Oil water separator

ii) Gravity separator

OR

Q8) a) Make a preliminary design for a separator to seperate a mixture of steam and water. Steam flow rate is 2500 kg/h and water flow is 1250 kg/h. Operating pressure is 4.2 bar. Liquid density = 950 kg/m^3 Vapour density = 2.5 kg/m^3 Design the separator with demister pad. **[10]**

b) Write about any two safety devices. **[8]**

Q 9) a) Natural gas with a specific gravity 1.20 at 1,43,000 kPa and 46°C is being blown down to 1,02,000 kPa. The flow rate could be from 95 m^3/day. The drop through pressure reducing regulator is 3,100 kPa, leaving 1,000 kPa for the pipe. The pipe length is 140 m upstream of the regulator and 8.7m downstream pipe diameters.

Molecular weight of gas = 20, $\psi = 0.6$. **[9]**

b) What are the desirable properties of piping material? **[7]**

OR

Q10)a) Explain the pipeline design for transportation of crude oil. **[9]**

b) What are the various types of supports used for piping? **[7]**

Q11) a) Water flows through a pipeline @ 1 kg/s., over a distance of 2 km. The impressed head of water = 9.8 m. What is the diameter of pipeline if ρ = 1000 kg/m^3 & μ = 1 mN.s/m^2. **[8]**

b) Give the design considerations in condensate pipeline. **[8]**

OR

Q12)a) Water is to flow through a pipeline with 25 mm I.D. for a distance of 2 km. The pressure drop = 10m of water. Density of water = 1000 kg/m^3, viscosity of water = 1 m Ns/m^2. Estimate the flow rate of water through the pipeline. **[8]**

b) Discuss the various factors considered while designing pipeline for natural gas. **[8]**

Total No. of Questions : 8]

SEAT No. :

P2998

[Total No. of Pages : 2

[5354]-214
B.E. (Chemical)
ENVIRONMENTAL ENGINEERING
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from, each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data, jf necessary.***

SECTION - I

Q1) a) What is air pollution? State its importance. **[8]**

b) What are sources of entry of dust in air? **[8]**

Q2) a) What are primary and secondary air pollutants. **[8]**

b) Mention the effects of various air pollutants on vegetation. **[8]**

Q3) a) Describe construction and working of ESP. **[8]**

b) Explain the natural mechanism for removal of air pollutants? **[8]**

Q4) Write short notes on (Any three)

a) Impact of population on environment **[6]**

b) Harmful effects of SO2 on human health **[6]**

c) Catalytic oxidation **[6]**

d) Nuclear energy and environment **[6]**

P.T.O.

SECTION - II

Q5) a) Describe the determination of dissolved oxygen in a water sample **[8]**

b) How turbidity of wastewater sample can be measured? **[8]**

Q6) a) Comment on importance of sludge in an activated sludge process **[8]**

b) How Ion Exchange can be important for the treatment of waste water? **[8]**

Q7) a) Discuss the technique of Sanitory Land filling in detail. State its merits and demerits. [8]

b) Give a brief account on various disinfectants used for the treatment of water. **[8]**

Q8) Write short notes on: (Any three)

a) Composting **[6]**

b) Effect of total dissolved solid in water **[6]**

c) Working of upflow anaerobic sludge blanket reactor **[6]**

d) Photocatalysis **[6]**

Total No. of Questions : 12]

SEAT No. :

P2999

[Total No. of Pages : 3

[5354]-215
B.E. (Chemical Engineering)
MEMBRANE TECHNOLOGY
(2008 Pattern) (Elective - I) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

SECTION - I

Q1) a) Explain the importance of separation operation in chemical manufacturing processes. **[8]**

b) Define membrane and classify membrane separation processes. **[8]**

OR

Q2) a) Classify membranes based on homogeneity, transport mechanism, nature of material electric charge, morphology. **[8]**

b) Discuss the materials used for preparation of membrane and explain characteristics of each. **[8]**

Q3) a) Explain the importance of glass transition temperature in determining sate of polymer **[8]**

b) Explain in detail characteristics of main chain elements & side group elements of polymer. **[8]**

OR

Q4) a) Define the glass transition temperature of polymer and explain the effect of polymer structure on it. **[8]**

b) Explain the use of copolymer and cross linked type of polymeric materials used for membranes. **[8]**

P.T.O.

Q5) Explain any four methods of preparation of composite membranes. **[18]**

OR

Q6) Explain in detail phase inversion and immersion precipitation methods for preparation of synthetic membranes. **[18]**

SECTION - II

Q7) Write a short notes on following methods of characterisation of UF membranes **[16]**

a) Thermoporometry

b) Permporometry

c) Gas-adsorption – desorption

d) Liquid Displacement

OR

Q8) Describe in detail process for characterisation of MF membrane with short notes on following points **[16]**

a) SEM

b) Bubble – Point method

c) Mercury Intrusion porometry

d) Permeability method

Q9 a) Explain the following mechanism used to describe transport through porous membranes **[8]**

i) Depth Filtration

ii) Surface of screen filtration

b) Distinguish between solution diffusion model and prove flow transport through membrane **[8]**

OR

Q10) Explain theory and applications of any four pressure- driven membrane separation processes. **[16]**

Q11) a) Explain boundary layer film model for concentration polarization **[8]**

b) Describe osmosis & Reverse Osmosis (RO) in detail and explain use of RO for desalination of water. **[10]**

OR

Q12) Explain the following applications of UF process **[18]**

a) Recovery of paint in automobile plaints

b) Clarification of fruit juice

c) Oil-water emulsions

Total No. of Questions : 12]

SEAT No. :

P3000

[Total No. of Pages : 2

[5354]-217

B.E. (Chemical)

CORROSION ENGINEERING

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the concept of polarisation and corrosion potential. **[8]**

b) Explain the mechanism of oxidation corrosion. **[8]**

OR

Q2) a) Explain the mechanism of oxidation corrosion. **[8]**

b) Enlist different surface coatings available for preventing corrosion. **[8]**

Q3) a) Discuss cavitation corrosion and remedial measures for controlling the same. **[8]**

b) What are various factors affecting corrosion of iron under aqueous media? **[8]**

OR

Q4) a) Explain the concept of cell potential and polarization. **[8]**

b) Explain Pourbaix-diagram for Fe -H_2O system. **[8]**

Q5) a) Describe EMF series. **[8]**

b) Explain the role of alloying in preventing corrosion. Support your answer with an example. **[10]**

OR

P.T.O.

Q6) Write short notes on the following : **[18]**

a) Thermodynamic aspects of corrosion

b) Evans diagram

c) Stress corrosion

SECTION - II

Q7) a) How does a material of construction alter rate of corrosion? Support your answer with an industrial example. **[8]**

b) Describe the working of reference electrodes used for corrosion measurement. **[8]**

OR

Q8) a) Describe the intergranular corrosion. **[8]**

b) What is Fretting corrosion? How to identify it? **[8]**

Q9) a) With the help of an example explain pitting corrosion. **[8]**

b) How galvanic corrosion can be prevented? **[8]**

OR

Q10)a) Compare the mechanisms of wet and dry corrosion. **[8]**

b) State and explain the Tafel equation. Mention its importance for studying corrosion. **[8]**

Q11) a) Discuss the performance of steel pipes in marine environment. Comment on the critical issues. **[10]**

b) What is significance of Pilling Bedworth ratio? **[8]**

OR

Q12)Write short notes on (Any three) : **[18]**

a) Pitting corrosion

b) Dezincification

c) Cathodic control

d) EMF series

Total No. of Questions : 12]

SEAT No. :

P3001

[Total No. of Pages : 3

[5354]-218
B.E. (Chemical Engineering)
CHEMICAL PROCESS SYNTHESIS
(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate fulll marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the concept of onion model with diagram. **[8]**

b) Discuss the approaches of chemical process design. **[8]**

OR

Q2) a) Write a short note on overall process model. **[8]**

b) Explain in short different parameters for choice of reactor. **[8]**

Q3) a) Explain different types of reactor systems. **[8]**

b) Explain with suitable example the concept of reaction path. **[8]**

OR

Q4) a) Write a short note on Idealized reactor model with single reaction as an example. **[8]**

b) Discuss preliminary selection criteria of distillation is the choice of separator. **[8]**

P.T.O.

Q5) a) What are the methods of separation of heterogeneous mixtures? Explain any one. **[8]**

b) Write short note on - any two: **[10]**

i) Reactor performance.

ii) Process synthesis.

iii) Absorption as a choice of separator.

iv) Parallel & Series reaction.

OR

Q6) a) Explain the role of temperature and pressure during the choice of reactor. **[10]**

b) Write a short note on any two: **[8]**

i) Fluidized bed catalytic reactor.

ii) Polymerization reactions.

iii) Reactor performance.

iv) Method of solid liquid separator.

SECTION - II

Q7) a) Draw a diagram of direct & Indirect sequence and explain in detail. **[8]**

b) Explain the concept of side reactifier arrangement. **[8]**

OR

Q8) a) Explain the concept of heat recovery pinch. **[8]**

b) With Suitable diagram and example explain in short the composite curve. **[8]**

Q9) a) Explain distillation sequencing for two component system with diagram. **[8]**

b) Explain Petluck column with respect to its thermally coupled arrangement of distillation column. **[8]**

OR

Q10)a) Write a short note on overall heat exchange network and utilities. **[8]**

b) Explain threshold problems in heat exchange network. **[8]**

Q11)a) What are safety and health considerations during synthesis of chemical process. **[10]**

b) What are preventive measures taken to avoid explosion. **[8]**

OR

Q12)a) Explain in short major hazards in process plants. **[8]**

b) Write short note on:

i) Toxic Release.

ii) Energy Target.

iii) Explosion hazards. **[10]**

Total No. of Questions : 12]

SEAT No. :

P3002

[Total No. of Pages : 2

[5354]-219
B.E. (Chemical)
ADVANCED MATERIALS
(2008 Pattern) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each Section.***
2) ***Answers to the two Sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is permitted.***

SECTION - I

Q1) a) Discuss the use Advanced Metallic Systems in industries. **[8]**

b) Write down the different types Steels for special applications with example. **[10]**

OR

Q2) a) Explain in detail Ductile Iron process. **[9]**

b) Explain the use of alloyed steels in various industries with example. **[9]**

Q3) a) Describe the different properties of polymeric materials with example in detail. **[8]**

b) Describe Polymer Technology with examples. **[8]**

OR

Q4) Explain in detail special polymeric materials with example and there industrial applications. **[16]**

P.T.O.

Q5) Explain different advanced processing methods for Engineering Materials in detail. **[16]**

OR

Q6) a) Describe advanced powder synthesis techniques. **[8]**

b) Explain in detail Micro structural design and grain boundary Engineering. **[8]**

SECTION - II

Q7) a) Write down the Physical and Chemical properties of Composite Materials. **[8]**

b) Explain Reinforcing mechanisms in composite materials. **[8]**

OR

Q8) Explain Reinforcing mechanisms and matrix materials with example in detail. **[16]**

Q9) a) Write short note on different types of reinforcement of metal. **[10]**

b) Crack propagation and mechanical behaviour of composite materials. **[8]**

OR

Q10) Write down the different industrial applications of Ceramic materials and Describe fabrication methods of Ceramic Composites. **[18]**

Q11) Explain Carbon composites, their properties, fabrication methods and their applications. **[16]**

OR

Q12) Define Nanomaterials with example. Write down the synthesis of nonmaterial's and what are the different applications of nonmaterial in chemical industries. **[16]**

Total No. of Questions : 12]

SEAT No. :

P2836

[Total No. of Pages : 3

[5354]-22
B.E. (CIVIL)
ADVANCED TRANSPORTATION ENGINEERING
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6 from Section-I Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12 from section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollies charts, electronics pocket calculator and steam tables is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) Discuss in brief the stages in transport planning process. **[12]**

b) Explain in brief the factors affecting Trip Generation and Attraction rates. **[6]**

OR

Q2) Explain in detail following : **[18]**

a) Home Interview Survey.

b) Traffic Volume Survey.

c) Trip distribution Methods

Q3) a) Discuss in brief the importance of grade separated interchanges in traffic control. **[6]**

b) Explain in brief the merits and demerits of intelligent transportation systems. **[10]**

OR

P.T.O.

Q4) a) Write a short note on Mass Rapid Transit systems. **[6]**

b) Explain in brief the following : **[10]**

i) Flyovers

ii) Underpass

iii) Overpass

iv) Meeting at Grade

v) Roundabout

Q5) a) What do you mean by economic evaluation of transportation plan? Also state the objectives of carrying out economic evaluation. **[10]**

b) Write a short note on benefit cost method. **[6]**

OR

Q6) a) Explain the merits and demerits of BOT projects. **[10]**

b) Write a short note on Internal Rate of return Method. **[6]**

SECTION - II

Q7) a) Explain in brief the Fundamental diagram of traffic flow. **[8]**

b) Explain in brief the following terms: **[10]**

i) Parking Accumulation

ii) Parking Volume

iii) Parking Load

iv) Parking Index

OR

Q8) a) Explain in brief the factors affecting capacity and level of service. **[8]**

b) Explain in brief the Cordon Line survey and Screen Line survey.

[5 + 5 = 10]

Q9) a) A Two lane two way road is at present carrying a traffic of 1000 Commercial Vehicles Per Day(CVPD) It is to be strengthened for growing traffic needs. The VDF has been found to be 3.0. The rate of growth of traffic is 10% per annum. The period of construction is 5.0 years. The pavement is to be designed for 15 years after construction. Calculate the cumulative standard axles to be used in design. **[10]**

b) State comparison between highway pavement and airfield pavement **[6]**

OR

Q10) a) Discuss the various types of failures in flexible pavement. **[10]**

b) Define Unevenness Index. Explain in brief the working of Bump Integrator. **[6]**

Q11) a) Explain in brief the various factors affecting design of rigid pavements. **[10]**

b) Discuss in brief assumptions made by Mr H M Westergaards while doing analysis of Cement concrete Pavements. **[6]**

OR

Q12) a) What is overlay? Why it is provided? Discuss in brief methodology of design. **[10]**

b) Discuss in brief assumptions made by Mr H M Westergaards while doing analysis of Cement concrete Pavements. **[6]**

Total No. of Questions : 12]

SEAT No. :

P3003

[Total No. of Pages : 2

[5354]-220
B.E. (Chemical Engineering)
POLYMER TECHNOLOGY
(2008 Pattern) (Elective - II) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, necessary.***
5) ***Use of logarithmic table, electronic pocket calculators is allowed.***

SECTION - I

Q1) a) Explain the properties of polymers based on Tacticity. **[10]**

b) Explain in detail different factors which need to be considered for determining mechanical properties of polymers. **[8]**

OR

Q2) a) Distinguished between Linear, Branch and Cross linked polymers with one example each. **[10]**

b) Explain the properties of polymers based on geometric isomerism and chemical composition. **[8]**

Q3) a) Explain with one example in detail Emulsion Polymerization Technique. **[10]**

b) Write a note on condensation Polymerization. **[6]**

OR

Q4) a) Explain in detail with examples Interfacial Polymerization Technique. **[8]**

b) Write a note on "Bulk polymerization". **[8]**

P.T.O.

Q5) a) Explain in detail with one example each the effect of Molecular weight distribution on properties of polymers. **[16]**

OR

Q6) a) Find the Number average, weight average Molecular weight and polydispersity Index of the given mixture which is composed of 100 molecule of 10,000 monomer lengths and 1900 molecules of 20,000 monomer lengths and 2500 molecules of 2000 monomer lengths. **[10]**

b) Write a note on Number and Weight average Molecular weight. **[6]**

SECTION - II

Q7) a) Discuss "Kinetics of step growth Polymerization". **[8]**

b) Explain with example importance of Chain Transfer Agents. **[8]**

OR

Q8) a) Discuss the mechanism of Free Radical Polymerization and derive necessary equations kinetics of Free Radical Polymerization. **[10]**

b) Discuss Gel Effect in Chain Growth Polymerization. **[6]**

Q09)a) Explain Bulk Molding Composition. **[9]**

b) Explain in detail with neat sketch Resin Transfer Molding. **[9]**

OR

Q10)a) Explain any two methods with neat sketch, working of thermoplastic molding. **[10]**

b) Discuss in detail any four additives with the importance used in polymer technology. **[8]**

Q11)Write a short note on reactor systems used for PP and PS. **[16]**

OR

Q12)Write a short note on reactor systems used for Butyl rubber and Nylon 66.**[16]**

Total No. of Questions : 12]

SEAT No. :

P3004

[Total No. of Pages : 3

[5354]-221
B.E. (Chemical Engineering)
PIPING DESIGN AND ENGINEERING
(2008 Pattern) (Elective-II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Answers to the two sections should be written in separate Answer books.***

SECTION - I

Q1) a) Explain the role of piping engineer in Construction and Commissioning phase of a chemical process? **[8]**

b) Explain the different minor losses occurring in piping systems? **[8]**

OR

Q2) a) Explain the pipe sizing steps based on available pressure drop? **[8]**

b) Discuss the different approaches used in the calculation of total pressure drop for parallel piping systems. **[8]**

Q3) a) Which are the different elements alloyed in carbon steel for modifying its chemical composition to obtain the desired mechanical and physical properties? **[10]**

b) State and explain the various types of codes used in piping industry? **[8]**

P.T.O.

OR

Q4) a) Write down the different grades of stainless steel used for piping material components? **[10]**

b) Discuss the different sections of ASME B31 Code for Pressure Piping? **[8]**

Q5) a) Discuss the working principle and applications of Rupture Disks? **[8]**

b) Discuss the different guidelines in selecting a suitable valve for any application? **[8]**

OR

Q6) a) State the advantages and disadvantages of globe valves? Also write down the applications of globe valves? **[8]**

b) Discuss the working principle of safety valve with the following points:

i) Lifting

ii) Reseating **[8]**

SECTION - II

Q7) a) How to determine the pipe size for steam piping? **[8]**

b) Explain the Homogenous and Heterogeneous Flow in slurry pipe lines? **[8]**

OR

Q8) a) Discuss the significance of Churchill and Swamee-Jain equation for calculation of friction factor in Compressed-Air Piping Systems? **[8]**

b) Explain the design and engineering of the slurry piping system components with the help of following points:

i) Special considerations of slurry handling

ii) Pumps for slurry **[8]**

Q9) a) Write down the typical layout considerations for distillation systems? **[8]**

b) Write short notes on **[10]**

i) High alloy steel & its usage in piping

ii) List of documents for preparation of layout for a process plant

OR

Q10)a) State and explain the considerations involved in the pipe rack design? **[10]**

b) Explain the concept of PFD, P&ID and utility diagram? **[8]**

Q11)a) Discuss the design criteria used in insulation system design for piping applications? **[8]**

b) Calculate the heat loss per square foot of surface area for steam pipe insulated with calcium silicate. Following data is available: **[8]**

Pipe size: NPS 6 (DN 150),

6.625 in (168 mm) actual OD

Operating temperature: 400F (204 C)

Ambient temperature: 75 F (24 C)

Insulation thickness: 2 in (51 mm) nominal

2.11 in (54 mm) actual

Insulation type: Calcium silicate

Length of pipe: 75 linear ft (22.8 m)

OR

Q12)Write short notes on: **[16]**

i) Selection criteria and general characteristics of steam trap

ii) Various types of Gaskets and their selection criteria

iii) Line sizing of pneumatic conveying system

iv) Pipeline Economics

Total No. of Questions : 12]

SEAT No. :

P3005

[Total No. of Pages : 3

[5354]-222
B.E. (Chemical)
ADVANCED SEPARATION PROCESSES
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers three questions from Sections I and three questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam table is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the basic concept of chromatography process. **[6]**

b) Give the applications of cross flow filteration in separation of enzymes and proteins. **[6]**

c) Explain Electroplating mechanism in separation of fluid-solid system. **[6]**

OR

Q2) a) Explain the detail working of chromatography. **[8]**

b) Explain the basic concept of HPLC process. **[10]**

Q3) a) Give the application of chromatography in separation of enzymes and proteins. **[8]**

b) Explain adsorption mechanism in separation of fluid-solid system. **[8]**

P.T.O.

OR

Q4) a) Give the advantages of membrane separation process over other separation technique. **[8]**

b) Explain four basic types of RO module currently manufactured. **[8]**

Q5) a) Give the characteristics of the complexing agent used in chemical-complexation. **[8]**

b) Explain the reactive distillation process in detail. **[8]**

OR

Q6) a) Give the solution characteristics of chemical complexation process. **[8]**

b) Explain 'Reactive crystallization' process in detail, **[8]**

SECTION - II

Q7) Write short notes on:

a) Design and development of froth flotation equipment. **[9]**

b) Application of flotation technique. **[9]**

OR

Q8) a) Give the flotation techniques classification on the basis of mechanism of separation and size of material separated. **[9]**

b) Explain 'Collapse and drainage phenomena'. **[9]**

Q9) a) Explain the adsorption properties and applications of molecular sieve. **[8]**

b) Explain Zone refining process in detail. **[8]**

OR

Q10) Write short notes on: **[16]**

a) Zone Electrophoresis

b) Adductive Crystallization.

Q11) Explain the classification of unit operations based on the property difference. **[16]**

OR

Q12) Write short notes on: **[16]**

a) Exchange Reaction

b) Describe mechanism and applications of supercritical fluid extraction in chemical & biochemical industry?

Total No. of Questions : 12]

SEAT No. :

P3006

[Total No. of Pages : 2

[5354]-223
B.E. (Chemical Engineering) (Semester - I)
PETROLEUM REFINING
(2008 Pattern) (Elective - II)

Time : 3.00 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Describe in Tests and properties of Gasoline & diesel. **[8]**

b) Why Pre-refining operation is necessary in the petroleum Industry **[8]**

OR

Q2) a) Discuss the growth of petrochemical Industry in India? **[8]**

b) What are the key issues and challenges for refineries in India? **[8]**

Q3) Describe Vacuum Distillation Unit with suitable Diagram and Distinguish between ADU and VDU with respect to various processing parameters? **[16]**

OR

Q4) What are different types of pipe still heaters? Describe the advantages and mechanism of electric desalting with schematic diagram? **[16]**

Q5) a) What is cracking operation? Describe the catalytic cracking process with typical diagram? **[2+6]**

b) What is reforming process? Describe reforming process with schematic diagram? **[2+8]**

P.T.O.

OR

Q6) Write short notes on: **[18]**

a) Hydro cracking operation

b) Delayed Coking operation

c) FCC Unit

SECTION - II

Q7) Why desulphurization is necessary? Describe hydrodesulphurization process with schematic diagram. **[16]**

OR

Q8) With neat schematic diagram describe the HDM process. **[16]**

Q9) a) Why additives are added in the petroleum products? Discuss in brief about the additives for diesel? **[8]**

b) With neat schematic diagram describe Hydro-refining techniques? **[8]**

OR

Q10)a) Discuss the transportation methodologies for petroleum products? **[8]**

b) Explain the storage method used for petroleum product? **[8]**

Q11)What is the role of catalysis in the petroleum industry? Enlist various catalyst used for refining and treatment techniques of petroleum fractions" **[18]**

OR

Q12)a) Write a note on packing material used for petroleum products? **[9]**

b) How is atmospheric pollution in refineries controlled & discuss the significance along with typical schematic diagram? **[9]**

Total No. of Questions : 12]

SEAT No. : ____

P3007

[Total No. of Pages : 3

[5354]-224
B.E. (Chemical)
Process Modeling & Simulation
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

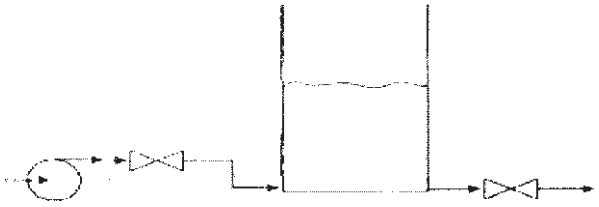
Q1) a) Classify models. **[8]**

b) Explain the modeling procedure. **[8]**

OR

Q2) What is the difference between white, black- and grey-box models. **[16]**

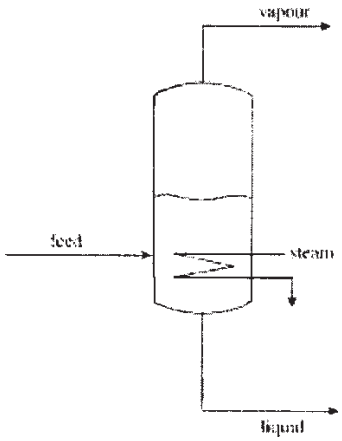
Q3) Consider the following tank problem where liquid is pumped into an open tank and then flows out under gravity. The situation is shown in Fig. If this situation is to be modelled for analysis of disturbances in the inlet flow pressure from the pump, develop the problem specification by considering the ingredients needed for the model. **[18]**



OR

P.T.O.

Q4) Consider a vessel, where a liquid feed is heated. Vapour and liquid are withdrawn. It is intended that a model of this process should be developed to investigate changes in the heat input Q from the steam coil as well as changes in feed conditions of temperature and composition. Develop a problem description for this situation discussing the necessary ingredients for the modeling. **[18]**



Q5) Explain the modeling procedure for single effect evaporator with neat figure. **[16]**

OR

Q6) Develop a model for triple effect evaporator. **[16]**

SECTION - II

Q7) Develop a model for continuous binary Distillation column. **[16]**

OR

Q8) Develop a model for adsorption column. **[16]**

Q9) Develop a model for slurry reactor. **[18]**

OR

Q10) Develop the general mass and energy balance equations for a tubular plug flow reactor, where the reaction kinetics are given by the following general expression:

$$r_i = k_i C_i^n = k_0 e^{-E/(RT)} C_i^n$$

Assume that the inlet flowrate is F/,2, inlet concentration is CAJH and temperature TQ. The reactor will be cooled or heated depending on whether the reaction is exothermic or endothermic. Give the initial conditions and boundary conditions for such a system. **[18]**

Q11) What is simulation? Explain with proper chemical engineering example. **[16]**

OR

Q12) Explain Chemcad in detail. **[16]**

Total No. of Questions : 12]

SEAT No. :

P3008

[Total No. of Pages : 3

[5354]-225
B.E. (Semester - II)
CHEMICAL
Process Engineering Costing and Plant Design
(2008 Pattern)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any 3 questions from each Section.***
2) ***Answers to the two Sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is permitted.***

SECTION - I

Q1) a) Explain factors affecting process selection. **[8]**

b) Explain the factors that govern selection of plant location. **[8]**

OR

Q2) a) Discuss in detail the techno-economic feasibility of report of a project. **[8]**

b) Explain significance of laboratory data in process development. **[8]**

Q3) a) Define depreciation and discuss its need and significance? **[8]**

b) Discuss various methods of determine depreciation charges. **[8]**

OR

Q4) Write note on:

a) Fixed capital. **[4]**

b) Working capital. **[4]**

c) 6/10 factor rule. **[4]**

d) Insurance. **[4]**

P.T.O.

Q5) a) Explain in detail mathematical methods for profitability evaluation with neat diagram. **[9]**

b) Explain cash flow analysis for an industrial operation. **[9]**

OR

Q6) a) Explain with a neat sketch cumulative cash position showing effects of cash flow with time for an industrial operation neglecting time value of money. **[9]**

b) A Company has three alternative investments which are being considered. Because all there investments are for the same type of unit and yields same service only one of the investments can be related. If a company In-charge expects 15% rate of return on original investment which one will be suitable? **[9]**

Item	Investment (I)	Investment (II)	Investment (III)
Initial Fixed Capital (Rs.)	1,00,000	1,70,000	2,10,000
Working Capital Investment (Rs)	10,000	10,000	15,000
Annual Cash Flow (Rs.)	30,000	52,000	59,000
Annual Expenditure (Rs.)	15,000	28,000	21,000

SECTION - II

Q7) a) Give difference between market survey and market research. **[8]**

b) Explain with a neat sketch the break - even chart for production schedule and its significance for optimum analysis. **[8]**

OR

Q8) A plant produces refrigerators at the rate of P units per day. The variable costs per refrigerator have been found to be Rs. (47.73 + 0.1 P1.2). the total daily fixed charges are Rs. 1750 and all other expenses are constant at Rs. 7325 per day. The profit is selling price per refrigerator minus total cost per refrigerator. Total cost per refrigerator is given as **[16]**

$$C_T = 47.73 + 0.1P^{0.2} + \frac{1750 + 7325}{P}$$

If the selling price per refrigerator is Rs. 173

Determine:

The daily profit at a production schedule giving the minimum cost per refrigerator.

i) The daily profit at a production schedule giving the maximum daily profit.

ii) The production schedule at the break-even point.

Q9) a) Derive the following equation for the optimum outside diameter of insulation in a wire for maximum heat loss **[10]**

$$D_{Opt} = \frac{2k_m}{(h_c + h_r)_c}$$

Where k_m is the mean thermal conductivity of the insulation and $(h_c + h_r)_c$ is the combined and constant surface heat transfer coefficient. The values of km and $(h_c + h_r)_c$ can be considered as constants independent of temperature level and insulation thickness.

b) Find the values of x, y and z that minimize the function x + 2y2 + z2 subject to the constraint that x + y + z = 1, making use of the Larangian multiplier. **[8]**

OR

Q10)a) Write an explanatory note on Pinch technology. **[9]**

b) Discuss the points in brief required while preparation of techno-economic feasibility report. **[9]**

Q11)Define CPM and PERT and explain the application of the same for setting up a new chemical plant. Define the activities involved in this project and construct the network diagram. **[16]**

OR

Q12)a) What points should be considered while deciding plant location? Draw a plant layout and name the parts. **[8]**

b) Differentiate between CPM and PERT. Give one example of each. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P3009

[Total No. of Pages : 2

[5354]-226

B.E. (Chemical Engineering)

ARTIFICIAL INTELLIGENCE IN CHEMICAL ENGINEERING

(2008 Pattern) (Semester - II) (Elective - III)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary.***

SECTION - I

Q1) With graph, explain the Artificial Intelligence (AI) trends in High Power and Low Power. **[16]**

OR

Q2) Not applications of Prolog as AI language. **[16]**

Q3) A flash column is to be designed using AI. Describe various steps in using AI for designing the system. **[16]**

OR

Q4) Develop the algorithm of AI to model the performance of Pipe Flow. **[16]**

Q5) Describe the knowledge base as the component of Expert System tool. **[18]**

OR

Q6) What is Object-Oriented Programming? How is Structuring of an Object-Oriented Program performed? **[18]**

P.T.O.

SECTION - II

Q7) Note the network steps involved in developing Frame based system for a Heat Exchanger. **[18]**

OR

Q8) Catalytic cracking is an energy-intensive unit operation. Develop fuzzy logic sets to describe the system. **[18]**

Q9) Explain *Data Abstraction* in Object Oriented Programming. **[16]**

OR

Q10) Write in details on *Inheritance* in Object Oriented Programming. **[16]**

Q11) With flowchart, describe *Systematic Object Management*. **[16]**

OR

Q12) With neat diagram, write in details on the *Elements of α Blackboard System*. **[16]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P3010

[Total No. of Pages : 3

[5354]-228

B.E. (Chemical)

CHEMICAL PROCESS SAFETY

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer 3 questions from Section 1 and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat Diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Define and explain OSHA incidence rate, FAR and FR? **[8]**

b) Explain three statistical methods to characterize accident and loss performance? **[8]**

OR

Q2) a) What are the ingredients of successful safety program. Draw a neat sketch and explain? **[8]**

b) Explain the importance of safety in chemical process industry. **[8]**

Q3) a) How will you estimate worker exposures to toxic vapors? **[8]**

b) Explain various government legislations on safety control presently applicable in chemical process plants. **[8]**

OR

Q4) Describe in detail the identification and evaluation of industrial hygiene. **[16]**

P.T.O.

Q5) a) Determine the 8-hr TWA worker exposure if the worker is exposed to toluene vapors as follows: **[8]**

Duration of exposure (hr)	Measured Concentration (ppm)
2	110
2	330
4	90

b) Distinguish between fire and explosion. Explain Fire Triangle in detail? **[10]**

OR

Q6) a) Define Ignition and Autoignition temperature, Fire Point, Vapor cloud explosions. **[8]**

b) Discuss in detail Flammability Characteristics of Liquids and Vapours. **[10]**

SECTION - II

Q7) a) Explain the preventive and protective measures to prevent fire in chemical industry? **[8]**

b) Explain the various safety devices for relieving pressure. **[8]**

OR

Q8) a) Describe the different methods to prevent fire & explotion? **[8]**

b) Describe in detail explosion proof equipment's and instruments? **[8]**

Q9) a) Explain Event Tree analysis for reactor with high temperature alarm and temperature controller? **[8]**

b) Explain the concept of HAZOP study and state guide words used for the HAZOP procedure? **[8]**

OR

Q10)a) Describe types of safety reviews and concept of risk assessment? **[8]**

b) What are the basic preventive and protection measures to hazards? **[8]**

Q11)a) How are disasters tackled? Explain the plan for emergency. **[10]**

b) Discuss the Emergency shutdown systems? **[8]**

OR

Q12)Explain briefly : **[18]**

a) Revealed and unrevealed failures.

b) Hazard models and risk data.

c) Safety versus production.

❖❖❖❖

Total No. of Questions : 12]

SEAT No. :

P2837

[Total No. of Pages : 3

[5354]-23
B.E. (Civil)
STATISTICAL ANALYSIS & COMPUTATIONAL METHODS IN CIVIL ENGINEERING
(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6 from Section - I and Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Construct a histogram for the following data and determine mean, median, mode and standard deviation. **[12]**

Class Interval	206-245	246-285	286-325	326-365	366-405
Frequency	3	11	23	9	4

b) Define standard deviation and variance. **[4]**

OR

Q2) a) Draw a dot diagram for the following data and find mean, median, mode, standard deviation. **[12]**

Class Interval	40-49	50-59	60-69	70-79	80-89
Frequency	5	18	27	15	6

b) What do you mean by sampling. Enlist methods of sampling. **[4]**

Q3) a) It is known that in a certain manufacturing process, 1% of the products are defective. If the average customer purchases 50 of these products at random, what is the probability that he receives 2 or less defective products. **[5]**

P.T.O.

b) A manufacturer of cotton pins knows that 5% of his product is defective. If he sells cotton pins in boxes of 100 and guarantees that not more than 10 pins will be defective. What is the probability that a box will fail to meet the guaranteed quality. **[5]**

c) Explain properties of normal distribution. **[6]**

OR

Q4) a) The number of monthly breakdowns of a computer is a random variable having a poisson distribution with $\lambda = 1.8$. Find the probability that this computer will function **[5]**

i) Without a breakdown.

ii) With only one breakdown.

b) It is given that 10% of the elective bulbs manufactured by a company are defective, in a sample of 20 bulbs. Find the probability that more than 2 are defective. **[5]**

c) Explain Chi Square goodness of fit test. **[6]**

Q5) a) Determine value of y at $x = 1.2$ from the following data. **[8]**

x	0	2	4	6	8
y	–77.5	–69.7	–51.5	15.5	169.7

b) Find equation of the curve from the following data in the form $P = C.V^{-n}$ **[10]**

P	5	10	15	20	25	30
V	0.3714	0.2264	0.1694	0.1380	0.1176	0.1033

OR

Q6) a) Fit a straight line relation to the following data in the form $F = aW + b$. **[8]**

W(kg)	1000	1200	1400	1600	1800	2000
F(N)	240	260	300	330	370	420

b) Determine correlation coefficient for the following data. **[10]**

x	10	7	12	12	9	16	12	18	8	12	14	16
y	6	4	7	8	10	7	10	15	5	6	11	13

SECTION - II

Q7) a) Solve using Gauss elimination method. **[8]**

$x_2 + 2x_3 = 5$; $x_1 + 2x_2 + 4x_3 = 11$; $-3x_1 + x_2 - 5x_3 = -12$

b) Solve using Gauss - Seidel method. **[8]**

$4x + y + 2z = 16$; $x + 3y + z = 10$; $x + 2y + 5z = 12$

OR

Q8) a) Solve using Gauss - Jordan method. **[8]**

$10x_1 + x_2 + x_3 = 12$; $2x_1 + 11x_2 + 2x_3 = 15$; $3x_1 + 4x_2 + 9x_3 = 16$

b) Solve using Gauss - Seidel method. **[8]**

$3x + y + 2z = 8$; $2x + 3y + z = 9$; $x + 2y + 3z = 6$

Q9) a) Explain Bisection method. **[8]**

b) Using Newton - Raphson method, Find root of the following equation. **[8]**

$e^{-x} = \sin x$

OR

Q10)a) Explain False Position method. **[8]**

b) Obtain the root of the following equation using Secant method. **[8]**

$x.\log_{10}x = 1.5$

Q11)a) Derive the equation for Gauss - Quadrature 2 point method. **[8]**

b) Solve the following using Gauss - Quadrature 2 point method and 3 point method. **[10]**

$$I = \int_0^{\pi} x.\sin x.dx$$

OR

Q12)a) Derive the equation for Simpson's 3/8 rule. **[8]**

b) Evaluate using Trapezoidal and Simpson's 1/3rd rule. **[10]**

$$I = \int_0^1 \frac{dx}{1+x^2}$$

Total No. of Questions : 12]

SEAT No. :

P3011

[Total No. of Pages : 3

[5354]-231

B.E. (Chemical Engineering)

CATALYSIS

(2008 Pattern) (Theory) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Assume suitable data, if necessary.***
3) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) Discuss the role of support in heterogeneous catalyst. **[8]**

b) Explain catalytic reaction feasibility with respect to activation energy and temperature. **[8]**

OR

Q2) a) Explain the qualitative nature and concept of catalysis and catalyst. **[8]**

b) Explain the role of supports in heterogeneous catalysis. **[8]**

Q3) a) State various adsorption isotherms and explain its significance. **[8]**

b) Solid catalyzed reaction $A \rightarrow 3R$ is conducted at 10 atm and 800°C in a basket type mixed reactor of 0.7 lit volume and containing 1g of catalyst of diameter dp = 3 mm. Pure 'A' is fed at various rates into the reactor. Partial pressure of 'A' in the exit stream is measured for each feed rate. Find the rate of reaction using the following kinetic results: **[10]**

Feed rate, lit/hr	100	22	4	1	0.6
P_A, out/P_A, in	0.8	0.5	0.2	0.1	0.05

OR

P.T.O.

Q4) a) Explain Eley-Rideal mechanism for surface reaction. **[6]**

b) A small experimental packed bed reactor (w = 1kg) using very large recycle of product stream gives the following kinetic data : **[12]**

$A \rightarrow R$	C_A, mol/m^3	1	2	3	6	9
CA0 = 10 mol/m^3	v_0, lit/hr	5	20	65	133	540

Find the amount of catalyst needed for 75% conversion for a flow rate of 1000 mol A/hr of a C A_o = 8 mol/m^3 feed stream:

i) In a packed led reactor with no recycle of exit fluid

ii) In a packed led reactor with very high recycle.

Q5) a) Derive Langmuir expression for adsorption isotherm. **[8]**

b) Write brief note on mass transfer in catalysis. **[8]**

OR

Q6) a) What is chemical and physical adsorption and explain its significance. **[8]**

b) Compare and contrast alumina and silica as catalyst support/carrier. **[8]**

SECTION - II

Q7) a) What is pore volume distribution? Describe the mercury penetration method for its measurement. What is N_2 desorption method? **[8]**

b) Describe the characteristics of supported metal catalyst with example. **[8]**

OR

Q8) a) Explain BET method for determination of surface area of the catalyst. **[8]**

b) Describe the general method of preparation of metal catalysts. **[8]**

Q9) What is relative activity and degree of inhibition caused by a competitive inhibitor when [S] = K_m and I = K? Derive the relation between these parameters. **[16]**

OR

Q10) Data for the enzyme catalyzed reaction S $\rightarrow$ P is as follows : **[16]**

[S] (M)	6.25×10^{-6}	7.50×10^{-5}	1.00×10^{-4}	1.00×10^{-3}	1.00×10^{-2}
v (nmoles/lit min)	15.00	56.25	60.00	74.90	75.00

a) Estimate V_{max} and K_m

b) What would 'v' be at [S] = 2.5×10^{-5}M and at [S] = 5.0×10^{-5}M?

c) What would 'v' be at 5.0×10^{-5}M if the enzyme concentration were doubled?

Q11) Write short note on following : **[18]**

a) Catalyst Deactivation

b) Zeolite modification

c) Alumina as support

OR

Q12) a) Explain the methods for evaluating the constants (k and Cm) of the m-m equation. **[9]**

b) Give the kinetics of competitive Inhibition. **[9]**

Total No. of Questions : 12]

SEAT No. : ____

P3012

[Total No. of Pages : 3

[5354]-233

B.E. (Chemical Engg.)

FUEL CELL TECHNOLOGY

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :100***

Instructions to the candidates:

1) ***Use two separate answer sheets for writing the answers to the two sections.***
2) ***Draw schematics wherever necessary.***
3) ***Assume suitable data wherever necessary.***
4) ***Write the chemical reactions wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables, slide rule, mollier charts, electronic pocket calculator and steam table is allowed.***

SECTION - I

Q1) a) Discuss the operating temperature of different types of fuel cell and its limitations. **[8]**

b) Explain the thermodynamics steps involved in fuel cells. **[8]**

OR

Q2) a) Describe Molten carbonate fuel cell with neat diagram. **[8]**

b) Discuss the advantages and limitations of fuel cell operating at low and high. **[8]**

Q3) Gibbs free energy for the formation of water is -59.69 cal/mol at STP conditions. In the typical SOFC, the partial pressure of hydrogen, oxygen and water vapor are 0.8,0.2 1 and 0.3 atm. Assume that the activities of the components are proportional to their partial pressures. The cell is operated at 885°C.Calculate: i) Standard open circuit potential and ii) Open circuit potential at the operating conditions. Faraday's constant is 96487 J/V.mol **[18]**

OR

P.T.O.

Q4) Develop the comprehensive material balance for the SOFC generating 800 KW power at 85% CHP efficiency and 60% electrical efficiency, by using externally reformed methane as a fuel and theoretical excess air as an oxidizer. **[18]**

Q5) What is the importance of Nernst equation? Derive Nernst equation for calculating open circuit potential of SOFC using H_2 as a fuel and O_2 as an oxidizer. **[16]**

OR

Q6) a) A current density of 15 A/m^2 is obtained when pure hydrogen in fed to SOFC at the pressure of 1.8 atm. Total pressure of gases at anodic side is observed to be 2.5 atm. Air is supplied at 1.8 atm. The cell is operated at 1000°C. The diffusion factor for hydrogen, oxygen and water vapor are 95,70 and 55 $C/s.m^2$ atm respectively. Calculate concentration overpotentials across anode and cathode. **[8]**

b) Calculate fuel utilization factor, air ratio, power output and fuel efficiency of SOFC using following data: **[8]**

Average current density	:	14 A/m^2
Active anode surface area	:	0.2 m^2
Fuel flow rate	:	25 mol/h
Fuel compositions	:	H_2 70% and CO 30%
Air flow rate	:	20 mol/h
Output potentials	:	230 V
Lower heating value of fuel	:	30000 Kcal/kg

SECTION - II

Q7) a) What is steam reforming? What is the advantages of internal steam reforming over external steam reforming? State its limitations. **[9]**

b) Explain the Kroger-Vink defect structure in solids. **[9]**

OR

Q8) a) Derive the Butler-Volmer form of equation for the charge transfer rates. **[9]**

b) Consider hydrogen-oxygen fuel cell operating at 25° C and at atmospheric pressure. Under these conditions, oxygen, hydrogen and product liquid water are in their standard states. Using the data given

below, calculate the thermodynamic potential (E) and the heat transfer (Q) between the cell and surrounding to maintain isothermal conditions and the electrochemical efficiency of the fuel cell. **[9]**

ΔH = - 285840 J/mol

ΔG = - 237190 J/mol

F = 96487 J/V.mol

Q9) a) Design a planer SOFC to generate 750 KW power for ethanol as a fuel. **[8]**

b) Design tubular SOFC to generate 200KW power from methane as a fuel. Single tube has anodic diameter of 20 mm and active length of 1.8 m. **[8]**

OR

Q10)a) Calculate mole fraction of defect at 150 and 950° C defect energy is 66 KJ/ Comment on the significance of results. **[8]**

b) What is steam reforming? What are the advantages of internal steam reforming. **[8]**

Q11)Explain the design of typical direct ethanol SOFC considering following aspects : **[16]**

a) Catalyst
b) Structure
c) Reactions and
d) Exit gas characteristics

OR

Q12)a) Explain the required characteristics of materials of construction, electrode, electrolyte and interconnect for SOFC. **[8]**

b) What is three phase boundary (TPB)? Explain the mechanism of charge transfer in TPB. **[8]**

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P3013

[Total No. of Pages : 2

[5354]-234

B.E. (Chemical)

PETROCHEMICAL ENGINEERING

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two Sections should be written in separate answer Books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is permitted.***

SECTION - I

Q1) a) What is importance of petrochemicals and the discuss the status of Petrochemical Industries in India. **[8]**

b) What are the main building blocks of petrochemical industry? Give the details of petrochemical products that are produced from benzene. **[8]**

OR

Q2) Draw a flow sheet for production of naphthene and explain the process with specification and process conditions. **[16]**

Q3) What are basic principle sources of aromatics? Describe the BTX aromatic separation by suitable diagram. **[16]**

OR

Q4) Describe CDU with suitable diagram? Distinguish between CDU and VDU. **[16]**

Q5) a) Write in details about the various separation and purification techniques used in petrochemical industry. **[10]**

b) Describe with schematic diagram Aromatic solvent extraction unit. **[8]**

P.T.O.

OR

Q6) a) Write short note on Ziegler-Natta catalysts. **[6]**
b) Write short note on Delayed coking. **[6]**
c) Write short note on Thermal cracking. **[6]**

SECTION - II

Q7) Along with schematic diagram and major engineering problems describe the production of terephthalic acid from p-xylene? **[16]**

OR

Q8) Along with essential reaction steps, write in detail about the production of ethylene glycol. Draw a neat schematic diagram. **[16]**

Q9) a) Discuss polymer synthesis and monomer purification. **[8]**
b) Explain Emulsion polymerization of styrene. **[8]**

OR

Q10)a) With neat sketches explain in detail about production of PVC alongwith its engineering problems. **[8]**
b) Explain classification of different polymerization process and discuss its advantages and disadvantage. **[8]**

Q11)a) Explain the control of emission from steam crackers using Best Available Technique (BAT). **[9]**
b) Discuss about recent advances in petrochemical plant& refineries in India. **[9]**

OR

Q12)a) Discuss in detail about the safety measures in oil refining industry?**[9]**
b) Write views on importance of power generation through petrochemical plants. **[9]**

Total No. of Questions : 12]

SEAT No. :

P3014

[Total No. of Pages : 3

[5354]-235

B.E. (Chemical Engineering)

COMPUTER AIDED PROCESS CONTROL

(2008 Pattern) (Semester - II) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Draw block diagram of computer aided process control architecture. Explain each component involved. **[18]**

OR

Q2) Explain in detail, Direct Digital Control with the help of schematic diagram. Give applications. State advantages of DDC over other control modes. **[18]**

Q3) a) What is MIMO process control? Explain the loop interactions for the system with three input two output variables. **[8]**

b) Based on Process Gain Matrix , suggest the pairing rules for input and output variables for 3 × 3 MIMO system. **[8]**

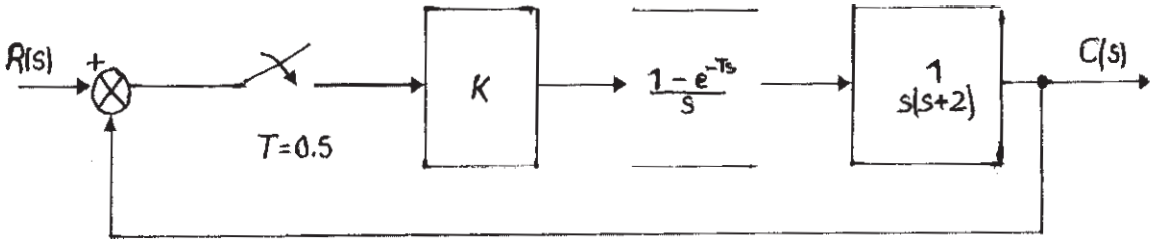
OR

Q4) a) Explain the digital control system with the help of block diagram. Explain the importance of each block. **[10]**

b) Can the loop interaction be eliminated? What strategy can be applied to eliminated loop interactions in MIMO systems. **[6]**

P.T.O.

Q5) Following figure shows digital control system. With K=2 and sampling time 0.5 seconds. Determine (a) Open loop pulse transfer function (b) Closed loop pulse transfer function. **[16]**



OR

Q6) a) Find the z-transformations of following functions **[8]**

i) $f(t) = e^{t}$

ii) $f(t) = e^{(-at)}$

iii) $f(t) = a$

iv) $f(t) = \cos(wt)$

b) Explain stability of digital control systems. How the s plain is mapped with z-plane? **[8]**

SECTION - II

Q7) a) Explain data transfer techniques for computer aided process control. **[8]**

b) Explain the role of real time programming languages in Computer Aided Process Control. **[8]**

OR

Q8) How modelling and simulation is done in digital process control? Explain the role of software in simulation of digital control systems. **[16]**

Q9) What is Distributed Control System? Explain in detail with the help of neat diagram. Enlist advantages and disadvantages. **[16]**

OR

Q10) What is plant wide control? Recommend a procedure to design plant wide control system. **[16]**

Q11) Write Short notes on the following : **[18]**

a) MIMO control for Distillation column with two products.

b) Applications of Plant wide Control.

c) Evolution of Computer Aided Control.

OR

Q12) Write Short notes on the following : **[18]**

a) MIMO control for packed bed reactor.

b) Industrial applications of Computer Aided Control.

c) SCADA.

❖ ❖ ❖ ❖

Total No. of Questions : 12]

SEAT No. :

P2838

[Total No. of Pages : 4

[5354]-24

B.E. (Civil Engineering)

FINITE ELEMENT METHOD IN CIVIL ENGINEERING

(2008 Pattern) (Semester - II) (Elective - IV)

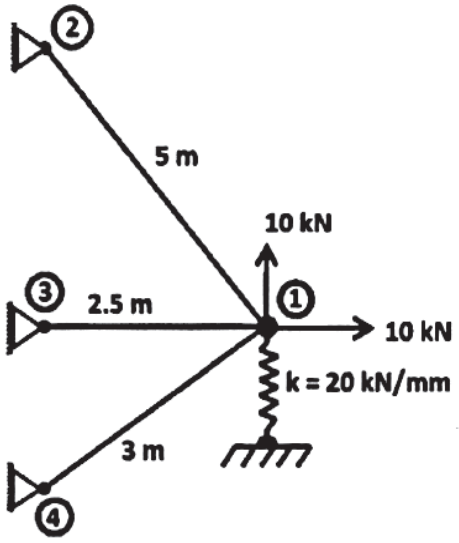
Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Answer Q.1 or 2, Q.3 or 4, Q5 or 6, Q7 or 8, Q9 or 10, Q11 or 12.*
2) *Answer to the two sections should be written in separate books.*
3) *Figures to the right indicate full marks.*
4) *Neat diagrams must be drawn wherever necessary.*
5) *Use of non programmable calculator is allowed.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Determine the horizontal and vertical displacements at node 1 using finite element method for the plane truss as shown in figure. Take E = 80 GPa and A = 600 mm^2 for all elements. The stiffness of spring is 25 kN/mm. **[12]**

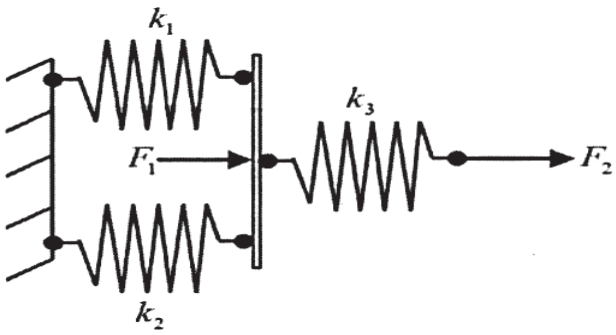


b) Explain step by step procedure of FEM. **[6]**

OR

P.T.O.

Q2) a) A three spring system shown in figure has stiffness $k_1 = 50$ N/mm, $k_2 = 60$ N/mm and $k_3 = 90$ N/mm. The loads applied are $F_1 = 150$ N and $F_2 = 80$ N. Calculate displacements at nodal points. **[12]**

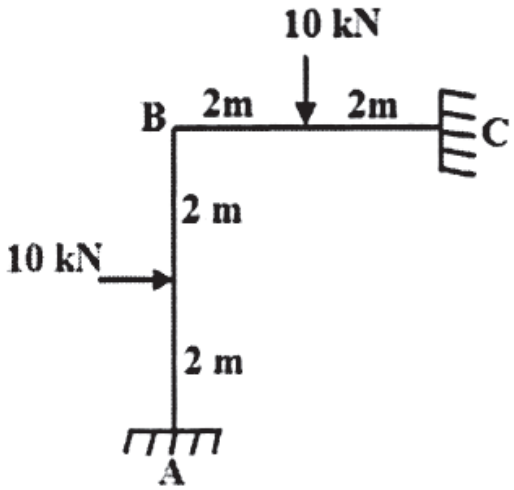


b) State the convergence criteria for the choice of the displacement function in FEM. **[6]**

Q3) Develop stiffness matrix for two noded grid element with three degrees of freedom at each node. Also explain transformation matrix for a grid element. Take El and GJ constant. **[16]**

OR

Q4) Determine the rotation of joint B for the frame supported and loaded as shown in figure. Take EI constant and neglect axial deformation. **[16]**



Q5) a) Drive differential equations of equilibrium for 3D elasticity problem. **[8]**

b) Derive Saint Venant's strain compatibility conditions. **[8]**

OR

Q6) a) Explain plane stress and plane strain elasticity problem with example. Write stress-strain relationship. **[8]**

b) Derive the stress compatibility conditions for 2D plane stress elasticity problem. **[8]**

SECTION - II

Q7) a) State and explain principle of minimum potential energy and principle of virtual work. **[6]**

b) Enlist the various 1D, 2D and 3D elements with diagrams used in finite element analysis. **[10]**

OR

Q8) a) Write short note on. **[6]**

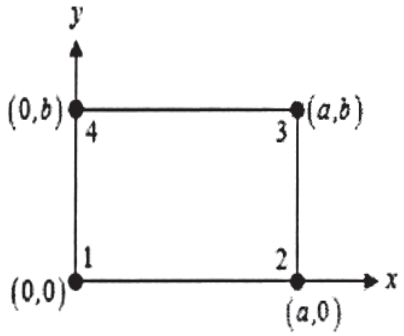
i) Discretization of structure

ii) Aspect ratio of element

b) State and explain the convergence criteria for the choice of the displacement function in FEM with examples. **[10]**

Q9) a) Derive shape functions for the nine noded rectangular elements in natural coordinate (ξ, η) system using Lagrange's interpolation function. **[8]**

b) Derive stiffness matrix for four noded rectangular element as shown in figure. **[8]**



OR

Q10)a) Derive shape functions for the eight noded serendipity element in natural coordinate (ξ, η) system. **[8]**

b) Using finite element approach, show that, stiffness matrix for one-dimensional axially loaded bar element is $[K]=\frac{AE}{L}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$. **[8]**

Q11)Derive the Jacobian matrix for the four noded quadrilateral isoparametric element having Cartesian coordinates at node 1(3, 1), node 2 (6, 1), node 3 (8,6) and node 4 (2, 5). **[18]**

OR

Q12)Derive necessary matrices [P], [A], [B] and [D] for formulation of stiffness matrix of 3D tetrahedron element. **[18]**

Total No. of Questions : 12]

SEAT No. :

P3988

[Total No. of Pages : 3

[5354]-241

B.E. (Production Sandwich Engg.)

ADVANCED PRODUCTION TECHNOLOGY

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the Two sections should be written in separate books.***
2) ***Answer Three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Discuss the physical aspects of high speed machining and hard-part machining. **[8]**

b) State in detail the Near Dry Machine tools and their Machining Operations **[10]**

OR

Q2) Explain the following in detail: **[18]**

a) High Speed Machining Technology

b) Dry machine tool and requisite equipments

c) Hard Part Machining

Q3) Discuss the following: **[16]**

a) Nano-Scale Machining

b) Magnetic Abrasive Finishing

c) Magnetic Float Polishing

P.T.O

OR

Q4) Discuss the following: **[16]**

a) Nano Metrology

b) Ultra-precision machines

c) Abrasive Flow Machining

Q5) Discuss the following: **[16]**

a) Computer Aided Inspection

b) Enterprise Resource Planning

c) Cellular Manufacturing Systems

d) Rapid Prototyping

OR

Q6) a) What is Computer Integrated Production Management? **[6]**

b) Explain the Manufacturing Resource Planning and Enterprise Resource Planning. What is the objective of their implementation? **[10]**

SECTION - II

Q7) Explain the following: **[18]**

a) Industrial Robots

b) Analytical Model of FMS.

c) Petrinets

d) Automated Workpiece Handling

OR

Q8) Explain the following: **[18]**

a) Centrifugal and Revolving Feeder

b) Design for Automated Assembly

c) Automated Factory

d) Features of Toyota Production System.

Q9) Explain the following: **[16]**

a) Hydraulic Valves

b) Hydraulic Servo Mechanism

c) Standard Components for Pneumatic Mechanisms

d) Applications of Pneumatic Mechanisms

OR

Q10) Explain the following: **[16]**

a) Hydraulic Actuators

b) Hydraulic Proportional Valves

c) Air Motors

d) Advantages of Pneumatic Mechanisms

Q11) a) What is F-R-L and what is the function of a lubricator? **[2]**

b) Explain with neat diagrams closed loop electro hydraulic control system and open loop hydraulic system. **[8]**

c) Describe the types and construction details of Piston Pumps and Gear Pumps. **[6]**

OR

Q12) a) Draw and explain constructional features of a 5/3-direction control valve of linear type along with its graphical symbol. **[8]**

b) Describe the principles and procedures for Pneumatic Circuit Design. **[8]**

Total No. of Questions : 6]

SEAT No. :

P2839

[Total No. of Pages : 3

[5354]-25

B.E. (Civil) (Semester - II)

GEOINFORMATICS

(2008 Pattern) (Open Elective)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Define resolution and explain any 2 types. **[8]**

b) Explain EMR. State the characteristics of different frequencies. **[8]**

OR

a) What are the elements of Visual Image Interpretation? Explain their significance and factors influencing them. **[8]**

b) Describe characteristics of LANDSAT 1, 2 & 3. **[8]**

Q2) a) Explain Supervised and Unsupervised Classification. **[8]**

b) Write a note on : **[8]**

i) Image Rectification.

ii) Geo referencing.

OR

a) What is false colour composite (FCC) Images? What are its advantages? **[8]**

b) Explain any two satellite images and its application. **[8]**

P.T.O.

Q3) a) What is Digital Image processing and briefly explain its application. **[10]**

b) "Geometric" Corrections in Images under processing. **[8]**

OR

a) Describe Characteristics of IR Images. **[10]**

b) Write a note on 'System Pour 1' Observation de la Terre. **[8]**

SECTION - II

Q4) a) What is 'MAP'? Describe different types of maps in brief. What are its limitations? **[8]**

b) Write a note on : **[8]**

i) Data types in DBMS.

ii) Attributes.

OR

a) Define GIS? Explain in detail its components. **[8]**

b) Explain : **[8]**

i) Vector Model

ii) Resolution

Q5) a) Write a note 'Buffering'. **[8]**

b) What is RDBMS? Explain the Normal form with one example. **[8]**

OR

a) Explain any one GIS software's and write a detail account on its Modules. **[8]**

b) Describe 'Raster' data structure. Write advantages and disadvantages. **[8]**

Q6) a) Explain application of Geo Informatics in following areas: **[10]**

i) Geotechnical Engineering

ii) Water Resource management through canal irrigation.

b) Write in detail Satellite Data acquisition. **[8]**

OR

a) Explain application of Geo Informatics with working flow charts in following areas: **[10]**

i) Road Survey and Investigations.

ii) Infrastructure Development.

b) Write a brief note on "Role of GIS in Terrain Analysis". **[8]**

Total No. of Questions : 12]

SEAT No. :

P2840

[Total No. of Pages : 3

[5354]-26

B.E. (Civil)

HYDROPOWER ENGINEERING

(2008 Pattern) (Open Elective)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain hydropower potential of India on the basis of river systems, number of schemes and percentage potential development. **[8]**

b) Differentiate between hydropower and thermal power. **[8]**

OR

Q2) a) State any four constraints on development of tidal power and wind power each. **[8]**

b) What are the different sources of energy? Differentiate between renewable and non renewable energy sources. **[8]**

Q3) a) Differentiate between microhydropower and storage hydropower plants. **[8]**

b) Classify Hydropower plant on the basis of functions and plant capacity. **[8]**

OR

Q4) a) With neat sketch explain any two types of run of river plants. State its components and functions. **[8]**

b) With neat sketch explain, components their functions and working of valley power plant. **[8]**

P.T.O.

Q5) a) Define and state equations for **[8]**

i) Load factor

ii) Capacity factor

iii) Utilisation factor

iv) Plant factor

b) The run off river hydropower plant has inflow of 30 cumees & it works On head of 50m with a provision for pondage to meet daily demand with load factor of 75%. Determine the power generation capacity of plant at 85% over all efficiency. What amount of pondage is needed if the plant operates at the peak station for six hours? **[10]**

OR

Q6) a) Explain the significance of load prediction what are the different methods of load prediction? Explain any one. **[8]**

b) A load on hydel plant varies from minimum of 10000 kW to a maximum of 40000 kW. Two turbo generators of capacities 22000 kW each have been installed. Calculate **[10]**

i) Total installed capacity of the plant

ii) Plant factor

iii) Maximum demand

iv) Load factor

v) Utilisation factor

SECTION - II

Q7) a) Describe any four powerplant equipments and their functions. **[8]**

b) Draw the typical layout of powerhouse and show all components. State function of all components. **[8]**

OR

Q8) a) What are the safety requirements of power house. **[8]**

b) With a neat layout explain components, their function and working of dam toe power house. Which type of turbine is preferred in dam toe power house? Why? **[8]**

Q9) a) Write short notes on :

i) Cavitation of turbine **[4]**

ii) Water hammer in turbine **[4]**

b) Design a pelton wheel with following data **[10]**

i) No. of jets - 2

ii) Head 400 m

iii) Power 15382 kW

iv) Speed 500 rpm

v) Overall efficiency 98%

vi) Cu = 0.98

vii) Speed ratio = 0.45

OR

Q10)a) Derive the equation for height of draft tube so as to install reaction turbine at appropriate working of pressure. **[8]**

b) Write design steps of different parameters of Impulse turbine with sketch. **[10]**

Q11)a) What are the provisions related to safety and electricity supply as per electricity act 2003. **[8]**

b) What is concept of Carbon credits, Explain its significance? **[8]**

OR

Q12)a) What are the duties of electricity generation companies. **[8]**

b) What is pricing of electricity? State any four factors governing pricing of electricity. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2841

[Total No. of Pages : 4

[5354]-28

B.E. (Civil)

MECHANICS OF WAVES (Open Elective)

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer any three questions from section one and three questions from section two.***
3) ***Answer to the two sections should be written in separate answer booklet.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figure to the right indicate full marks.***
6) ***Your answer will be valued as a whole.***
7) ***Use of electronic pocket calculator is allowed.***
8) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Draw definition sketch of a propagation wave naming various parts. **[4]**

b) Explain working of a wave rider buoy in brief. **[4]**

c) Obtain the values of significant wave height and period in deep water generated by a wind (corrected) speed of 22 m/s and lasting for 4 hours over a fetch of 12.5 km. State whether the sea is fetch controlled or duration controlled. Use SMB curves. **[8]**

OR

Q2) a) Define wave number, wave length, wave steepness. **[6]**

b) Write a short note on Darbyshire and Draper technique for wave prediction. **[4]**

c) What are the types numerical models. Explain any one of them in detail. **[6]**

P.T.O.

Q3) a) Derive equation for water particle displacement from mean position. **[6]**

b) What are the assumption in linear wave theory. **[4]**

c) For a wave of height 3 meter and period 10 sec propagation over a depth of 20 m find expressions for vertical and horizontal velocities of particles at 1.5 m below the trough. **[8]**

OR

Q4) a) Derive expression for group velocity of waves. **[6]**

b) Write short note on Stokes wave theory. **[4]**

c) A subsurface pressure gauge located at 0.8 m above sea level in 15 m water depth records average maximum pressure of 130 kN/m^2 and average pressure frequency of 0.0666 Hz. Obtain height of wave. Take specific weight of water as 10.06 kN/m^3. **[8]**

Q5) a) Prove that $s(f) = 4\int_0^\infty R(\tau(\cos 2\pi f\tau d\tau$ where s(f) is spectral density function, $R(\tau)$ = auto correlation. **[6]**

b) Enumerate various theoretical wave spectra. Explain any one of them in detail. **[4]**

c) What is long term wave height statistics? Name various distribution used to achieve the same while explaining Log-Normal distribution in detail.**[6]**

OR

Q6) a) Annual data of significant wave heights were collected for a site along west coast of India is given below **[10]**

H_s(m)	0	1	2	3	4	5
Observations	1256	823	321	191	8	1

Obtain the design H_s value corresponding to 100 years return using the Gumbel distribution

b) Define stationary process, ergodic process, probability density function. **[6]**

SECTION - II

Q7) a) A wave of 10 sec period and 4 m height in deep water travels shoreward over shoaling bottom. Calculate its height in 5 m depth. Assume no refraction. **[6]**

b) Explain with neat sketch the wave diffraction. What are assumptions made in theory of diffraction **[6]**

c) Write short note on wave set up. **[4]**

OR

Q8) a) A wave has 3 m height and 6 second period in deep water. It travels towards shore on parallel bed contours. If its crest makes an angle of 30° with the bed contour 12 m before refraction, calculate wave height after crossing this contour. **[10]**

b) Write a detail on wave breaking. **[6]**

Q9) a) Draw sketches for pressure distribution of non breaking wave forces using Miche-Rundgren method. Write expressions for yc and yt with usual notations. **[8]**

b) For a smooth faced vertical wall the incident wave height is 1 .5 m and depth at the structure of the toe is 3 m. For a wave period of 7 sec find the height of the clapotis crest and trough above the bottom (yc and yt). **[8]**

OR

Q10)a) What is effect of angle of wave approach on forces due to waves? Explain with sketch. **[8]**

b) For a smooth faced vertical wall the incident wave height is 1.5 m and depth at the structure of the toe is 3 m. For a wave period of 10 sec the height of the clapotis crest and trough above the bottom (yc and yt) is 5.85 m and 2.85 m respectively. Find the horizontal wave forces (Fc and Ft). Also calculate the total wave forces. **[8]**

Q11)a) Write in brief about calculation of wave forces using Dean's theory. **[10]**

b) A one meter jacket leg is subjected to an attack of waves which are 4 m high, 55 m long and 7 seconds in period. Determine the maximum drag force, maximum Inertia force, Total Force at $\theta = \pi / 4$ at a location 8 m below SWL. The water depth is 60 m. Take $C_D = 1$, $C_m = 2$, $\rho = 1030 kg/m^3$. Use linear theory. **[8]**

OR

Q12)a) Derive equation for variation of drag force along the total member length of vertical member. **[10]**

b) How the wave forces on small diameter members are measured using Stokes theory. **[4]**

c) What are limitations of Morrison's equation? **[4]**

Total No. of Questions : 12]

SEAT No. :

P2842

[Total No. of Pages : 4

[5354]-29

B.E. (Civil Engineering)

FERROCEMENT TECHNOLOGY

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7or Q. 8, Q. 9 orQ. 10, Q. 11 or Q. 12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***
5) ***Use of calculator is allowed.***

SECTION - I

Q1) a) What is ferrocement? Describe the various composition of ferrocement& also explain the concept Bond increase? **[8]**

b) Comparison of ferrocement with R.C.C &prestressed concrete. **[5]**

c) Describe the concept job required of skills, tools & plants? **[5]**

OR

Q2) a) Explain properties & specification of raw materials. **[5]**

b) Explain in brief ferrocement as substitute for conventional building materials. **[5]**

c) What are the typical Characteristics & their application in ferrocement technology? Describe forming of ferrocement structure? **[8]**

Q3) a) What are the different mechanical properties of ferrocement? Describe any two. **[5]**

b) Describe the following concept related ferrocement **[6]**

i) Shrinking Creep

ii) Different testing of ferrocement

iii) Damage to ferrocrete structure

c) What are the typical feature affecting ferrocement design explain any two in brief? **[5]**

P.T.O.

OR

Q4) a) Given in detain method of construction of ferrocement with proper planning of the work? **[5]**

b) Describe the following concept **[6]**

i) Fabricating of skeletons

ii) Tying mashes &mortaning

iii) Curing & maintenance

c) Explain the properties under Static & Dynamic loading in ferrocement?**[5]**

Q5) a) Describe the concept of "Strength through Shap" with suitable example? **[4]**

b) Explain design of structure based an form & shape? **[4]**

c) What are the special Design consideration of ferrocement and also gives the typical features affecting design of ferrocement? **[8]**

OR

Q6) a) Explain the concept Design, Analysis and Optimization? **[4]**

b) Give the comparative study of various forms with suitable example? **[4]**

c) What are Different forms in nature related to structure behaviour explain any two in details? What are the different design method in ferrocement?**[8]**

SECTION - II

Q7) a) What are the different aspects to be considered in cost analysis of ferrocement construction? **[6]**

b) Explain the following concepts related to factors governing cost of structures? **[6]**

i) Specification and unit of measurement

ii) Materials

iii) Labour required and Contingencies

c) Describe the various building component of ferrocement in detail? **[6]**

OR

Q8) a) Explain the statement "Ferrocement is Earthquake Resistance Structure"? **[6]**

b) Explain the following concept of design and construction of hours with ferocrete technology? **[6]**

i) Cavity wall

ii) Hollow floors & hollow Beams

iii) Building accessories

c) Give any two examples in details of cost comparison of ferrocement construction with conventional construction? **[6]**

Q9) a) Why ferrocement technique for water retaining structure? **[6]**

b) Explain the concept **[6]**

i) Structure across stream

ii) Layered system of ferrocement application

iii) Water storage structure

c) What are types of retaining walls and their comparison with ferrocementarch faced wall? **[4]**

OR

Q10)a) What are the various structure of water retaining in ferrocement? **[6]**

b) Explain the concept **[6]**

i) Soil retaining structure

ii) Ferrocementcounterfort retaining wall

c) What are the various design recommendation of ferrocement water retaining structure? **[4]**

Q11)a) Which different parameter are consider in ferrocement precast product and why ferrocement for pre-casting? **[8]**

b) What are different precast element of ferrocement used in building and water related structure? **[8]**

OR

Q12)a) Describe the concept of 'Ferrocement in large size special purpose structure'. **[8]**

b) Explain the concept **[8]**

i) Joints in precast ferrocement elements

ii) Space Structures

Method of pre-casting

Economic maintenance of precast elements

Total No. of Questions : 8]

SEAT No. :

P2823

[Total No. of Pages : 4

[5354] - 3
B.E. (Civil)
STRUCTURAL DESIGN - III
(2008 Pattern)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4 from Section - I.***
2) ***Answer Q.5 or Q.6, Q.7 or Q.8, from Section - II.***
3) ***Answer to the two sections should be written in separate answer - books.***
4) ***Figures to the right indicates full marks.***
5) ***IS 1343, IS 456, IS 3370 are allowed.***
6) ***Assume suitable data wherever necessary and mentioned if clearly.***

SECTION - I

Q1) a) Differentiate between Pretensioning and Post tensioning. **[5]**

b) A post tensioned pre stressed Concrete beam section has top flange 450 x 300 mm, web 250 x 800 mm and bottom flange 500 x 250 mm is simply supported over an effective span of 16 meter. The beam is pre stressed with 5 no's of 12/5 Freyssinet parabolic cables (Fy = 1500 Mpa) with their C.G. 100 mm from extreme bottom fiber, stressed one at a time from both end, Calculate total loss of prestress at the age of 100 days if K = 0.0026/m length of cable, slip of anchorage = 2mm, Cc = 1.8, Es = 2×10^5 Mpa, Concrete grade M 40, Creep and relaxation = 2% of initial prestress. **[20]**

OR

Q2) a) Explain various methods of Post tensioning. **[8]**

b) An unsymmetrical prestressed concrete section has top flange 400 x 250 mm, bottom flange 500 mm x 300 mm, and web 300 mm x 1050 mm, it is supported over a span of 17m carries super imposed load of 14 KN/m, the effective prestressing force is 1450 KN located at 100 mm from soffit of the section at mid span, cable profile is parabolic and concentric at support. Calculate extreme fiber stresses in concrete at mid span at initial and final state. Take loss ratio as 0.85 and unit weight of concrete as 25 KN/m^3. **[17]**

P.T.O.

Q3) Design a Post tensioned Pre stressed concrete beam using I-section for flexure to carry a live load of 18 KN/m over a simply supported span of 18 m with M40 grade of concrete and Freyssinet cables of 12/5 (f_y = 1750 Mpa) or 12/7 (f_y = 1500 Mpa), Design the End block also. Draw sketches showing details of cable profile, end block reinforcement Check for fiber stresses in concrete and deflection is must. **[25]**

OR

Q4) a) Explain any one method of post tensioning with neat sketches. **[5]**

b) A post tensioned pre stressed concrete Two-way slab of 6 m x 7.5 m with discontinuous edge to support imposed load of 5 KN/m^2 using S3 strands each having cross sectional area 100 mm^2 and f_y = 1900 Mpa check the safety of the slab at collapse and deflection at service load. Use M40 grade of concrete. **[20]**

SECTION - II

Q5) Fig (1) shows an intermediate frame of multistoried building the frames are spaced at 3.5m centre to centre analyze the rigid jointed frame taking live load as 3.0 KN/m^2 and dead load as 4 KN/m^2 for panel AB and BC respectively. The self weight of beam AB is taken as 4 KN/m and for BC as 3 KN/m. The relative stiffness of all members is same. Use Portal method for horizontal load and Proper Substitute frame for vertical loading. Design the Beam ABC for combined effect of horizontal and vertical loading using 15% redistribution of moments for vertical load moments. Use M20 and Fe415. **[25]**

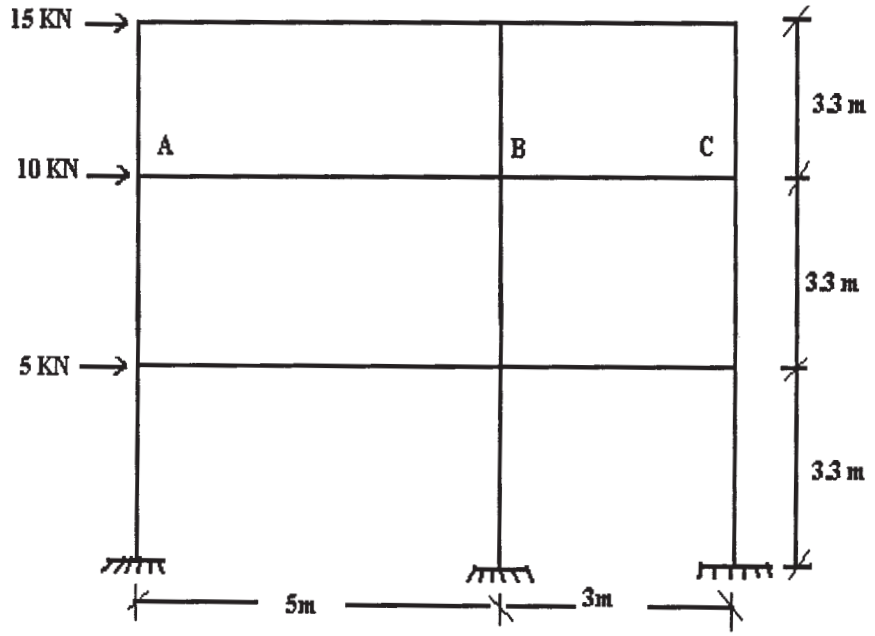


Fig. 1

OR

Q6) a) Explain in detail Portal Method of analysis. **[7]**

b) Analyze the rigid jointed frame as shown in fig (2) by Cantilever Method for lateral loads. Flexural rigidity of all members is same. Analyze beam GHI using proper substitute frame method if it is subjected to vertical ultimate dead load and live load of intensities 12.5 KN/m and 15 KN/m on Span GH and 10 KN/m and 15 KN/m on HI respectively. The Horizontal forces are as shown in figure. Calculate maximum span moment for GH and Support moment at H. Design Beam GHI for combined effect of horizontal and vertical loading using 20% redistribution of moments for vertical loading. Use M25 and Fe 500. **[18]**

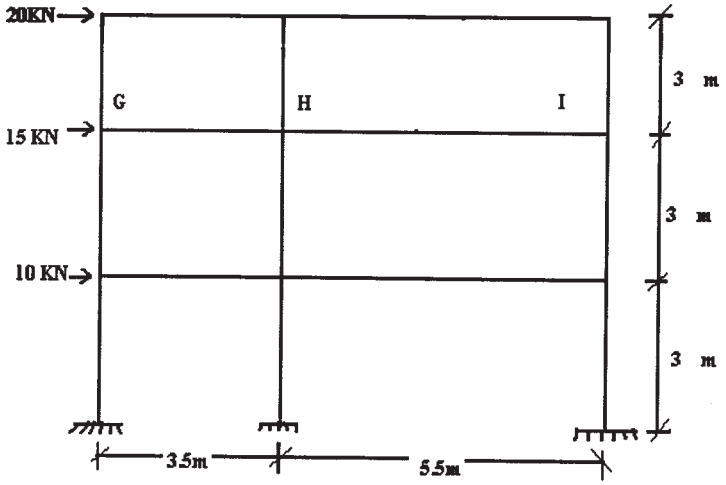


Fig 2

Q7) a) Explain with neat sketches various types of combined footing and state in what situations these are used. **[5]**

b) Design a Rectangular water tank resting on ground of 2.0 lack Liter capacity, open at top, the joint between wall and base slab is rigid, taking L/B ratio as 1.7 the safe bearing capacity of supporting strata is 210 KN/m^2, Design the wall and bottom slab of the tank. Draw details of reinforcement, use approximate method. **[20]**

OR

Q8) Design a T-Shape Cantilever retaining wall with following data: **[25]**

a) Height of soil to be retained above base = 4.75 m.

b) Unit weight of Soil = 19 KN/m^3.

c) Angle of repose = 30º.

d) SBC of Soil = 210 KN/m^2.

e) Coff. of friction between base & soil = 0.47.

f) Material - M20 & Fe-500.

g) Leveled Backfill.

Show all necessary stability checks & details of reinforcement in stem, heel & toe.

Total No. of Questions : 12]

SEAT No. :

P2843

[Total No. of Pages : 3

[5354]-30

B.E. (Civil)

PLUMBING ENGINEERING

(2008 Pattern) (Open Elective)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.No. 1 or Q.No. 2, Q.No. 3 or Q.No. 4, Q.No. 5 or Q.No. 6, Q.No 7or Q.No. 8, Q.No. 9 or Q.No. 10, Q.No. 11 or Q.No. 12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Describe the role of Plumbing consultant while executing plumbing work in the building industry. **[9]**

b) Comment on coordination of plumbing agency with other construction agencies while execution of plumbing. **[9]**

OR

Q2) a) Describe the role of Plumbing contractor while executing plumbing work in the building industry. **[9]**

b) What are prohibited fittings and explain its role in plumbing. Explain your answer with neat sketch? **[9]**

Q3) a) Explain any two plumbing fixtures with neat sketch. **[8]**

b) What are various plumbing tools? Explain any three tools with sketch. **[8]**

OR

Q4) a) Explain PEX and MDPE pipes in plumbing industry and state their advantages and disadvantages. **[8]**

b) What is DFU? State at least four WSFU and how will you use it in plumbing design? **[8]**

P.T.O.

Q5) a) Why it necessary to provide various traps in plumbing engineering? Explain with neat sketch S-Trap, P-Trap and Nahani Trap. **[8]**

b) State various types of traps in plumbing engineering. Explain with neat sketch Grease- Trap,Prohibited Trap and Gully Trap. **[8]**

OR

Q6) a) Why vents are required in plumbing engineering? Explain with neat sketch various parts of vents for double and single stack system. **[8]**

b) What is trap seal? How it is protected? Explain with neat sketch sewer trap. **[8]**

SECTION - II

Q7) a) State four types of sanitary systems of plumbing and explain any two systems. **[8]**

b) State the different types of building drainage pipes explain any two with sketches. **[8]**

OR

Q8) a) Why inspection of chamber is necessary. Differentiate between soil and waste verses black and grey water. **[8]**

b) State four DFU values and how will you use it in drainage design? **[8]**

Q9) a) What is storm water drainage system explain with sketch layout of storm drainage system and highlight its importance. **[9]**

b) State the design steps for rain water harvesting system. **[9]**

OR

Q10)a) State the advantages of solar water heating. State various components of solar water heating system. **[9]**

b) Draw a neat sketch (elevation of wall) of hot and cold concealed piping for bathroom, stating standard levels and spacing's of fixtures and fittings as per standards. **[9]**

Q11)a) Explain RCC, PVC, Nu-Drain and stoneware in building sewer system. **[8]**

b) How will you carry out testing of drain pipe in drainage line. **[8]**

OR

Q12)a) Explain how you will supervise execution of drainage line for G+ 3 Apartment. **[8]**

b) What care you will take while designing plumbing system for high rise buildings and what is the role of pressure reducing valves (PRV). **[8]**

Total No. of Questions : 12]

SEAT No. :

P2844

[Total No. of Pages : 3

[5354]-30-A

B.E. (Civil)

GREEN BUILDING TECHNOLOGY

(2008 Pattern) (Elective - IV) (Open Elective)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from section I and Section II.***
2) ***Figures to the right indicate full marks.***
3) ***Your answers will be valued as a whole.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Discuss in details the sustainable site selection criteria. **[7]**

b) Discuss the uses of following : **[4 + 3 + 2]**

i) Building layout plan

ii) Solar Energy

iii) Fresnel Lens

OR

Q2) a) Differentiate with example between direct and indirect lighting. **[6]**

b) What is solar concentrator? Discuss. **[5]**

c) Why the ventilation is necessary? Explain how natural ventilation utilized. **[6]**

Q3) a) Differentiate with example the active and passive architecture. **[6]**

b) Explain the concept of Embodied Energy. **[5]**

c) What is the selection criteria for material of surface treatment. **[6]**

OR

Q4) a) Explain hybrid system of active and passive refrigeration and air conditioning. **[8]**

b) Explain the Energy audit of Building in detail. **[8]**

P.T.O.

Q5) a) Discuss the Green rating of Building. **[8]**

b) What you understand by environmental clearance of buildings? Discuss. **[8]**

OR

Q6) a) Discuss the improvement for thermal comfort. **[6]**

b) Discuss the followings : **[6+5]**

i) LEED Criteria & its application

ii) Carbon credit.

SECTION - II

Q7) a) What is water efficient landscaping give the details. **[6]**

b) Discuss any one method with suitable sketch for bore well recharging. **[6]**

c) Explain the method for the minimization of water use. **[5]**

OR

Q8) a) Explain the followings : **[3 + 4 + 4]**

i) Smart water taps

ii) Anaerobic filters

iii) Ion exchanger

b) Discuss about advanced biogas plant. **[5]**

Q9) a) What is indoor environmental quality? Explain in detail. **[8]**

b) Discuss how the quality of indoor environment is maintained? **[8]**

OR

Q10)a) Differential the following : **[4+3]**

i) Adhesives and Sealants

ii) Paints and Coatings

b) Discuss the uses of following **[4 + 3 + 3]**

i) Composite Wood

ii) Bamboo

iii) Jute

Q11)a) How the recycling of building materials is beneficial? Discuss. **[8]**

b) Discuss the Life cycle analysis in brief. **[8]**

OR

Q12)a) Discuss the followings : **[4 + 3 + 3]**

i) Operation Phase

ii) Construction Phase

iii) Use of Foundry sand

b) Explain in details about Construction waste management. **[7]**

Total No. of Questions : 12]

SEAT No. :

P2845

[Total No. of Pages : 5

[5354]-31

B.E. (Mechanical Engg.)

CAD-CAM & AUTOMATION

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q. No.1 OR 2, No.3 OR 4, No.5 OR .6 No.7 OR 8, Q.No.9 OR 10, No.11 OR 12.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic non programmable pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is Homogeneous representation? Explain its significance in Computer graphics using suitable example? **[8]**

b) A triangle ABC having coordinates A (10, 10) B (15, 17) and C (20, 10). If the triangle is, **[10]**

i) Rotated by 90° clockwise about the vertex A.

ii) Scaled by 0.5 times in X direction and 2 times in Y direction about vertex C.

iii) If it is mirrored about a line y = x.

Determine the distance of nearest corner of a triangle ABC from the origin.

OR

Q2) a) What is Inverse Transformation? What is its significance in Computer graphics? **[8]**

b) A tetrahedron is defined by the following points A(2,3,4,) B(6,3,4) C(2,5,4) and D(4,4,10) with a transformation matrix, generate data for the orthographic views of the object in viewing planes. Also generate data for isometric view. **[10]**

P.T.O.

Q3) a) Explain the terms parametric continuity C_0, C_1 & C_2 with neat diagram. **[4]**

b) Explain the Hermite bicubic Surface and Bezier surface? **[6]**

c) Differentiate between the B- rep and CSG approach in solid modeling. **[6]**

OR

Q4) a) Given B_0 [1, 1], B_1 [2, 3], B_2 [4, 3] & B_3 [3, 1] the Vertices of Bezier polygon. Derive Bezier curve equation for the given points & determine points on the Bezier curve at parameter u = [0, 0.25, 0.5, 0.75, 1]. **[8]**

b) Compare Explicit and Implicit non parametric representation of curve. Explain the parametric representation of a curve and its advantages over non parametric representation with suitable example. **[8]**

Q5) a) Derive the relation between natural and Cartesian coordinates of a triangular element. **[6]**

b) A two member truss is as shown in the Fig.1. The cross - sectional area of each member of the truss is 100 mm^2 and the modulus of elasticity is 200 GPa. Determine the deflections, reactions and stresses in each of the members. **[10]**

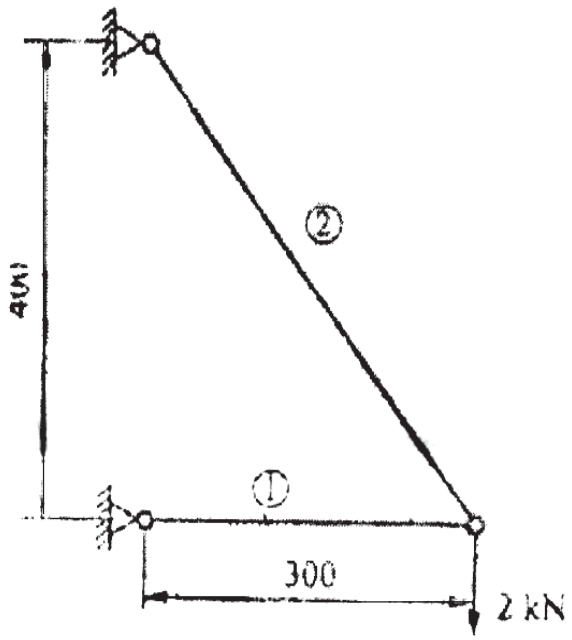


Fig. 1

OR

Q6) a) For the spring system with arbitrarily numbered nodes and elements, as shown in fig.2, find the global stiffness matrix. **[10]**

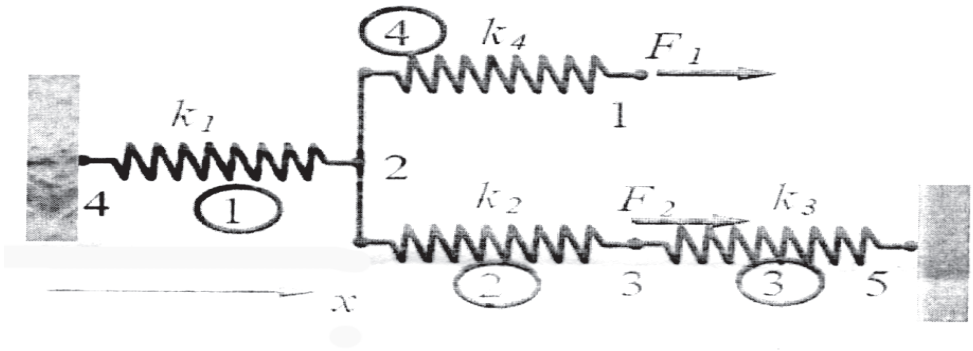
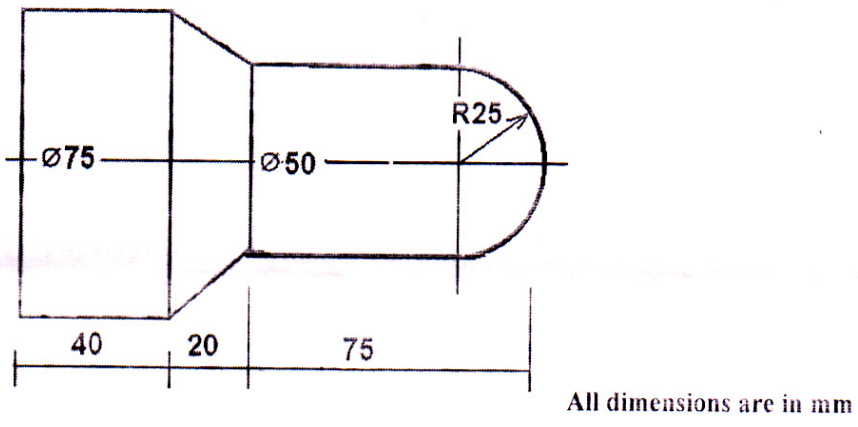


Fig.2

b) A briefly explain the steps to be followed in manually carrying out the finite element solution to a physical problem. **[6]**

SECTION - II

Q7) a) Write a CNC part program to turn a MS bar of size and shape as shown in following figure. Use *canned cycles* only for both rough turning and finish cut. **[12]**



Assume feed rate, F= 0.5mm/rev, and spindle speed, S = 200 RPM

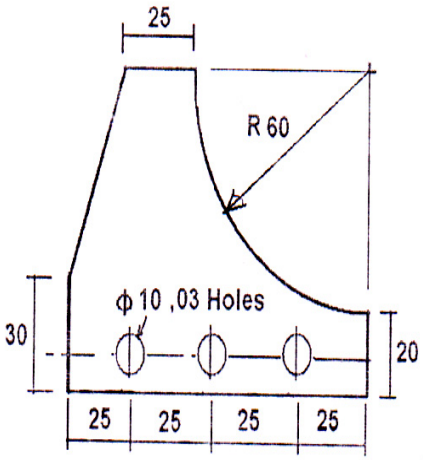
b) Classify CNC machines based on the : **[6]**

1. Motion type 2. Control loops 3. Number of axes

Explain 2, 2 ½ and 3 axes CNC machines with neat sketch.

OR

Q8) a) Write a CNC part program to machine the profile and drill the holes as shown in figure, assume suitable data for feed and speed.. Use peck *drill* cannedcycle for drillingoperations.Also use cutter radius compensation (right). Take thickness of plate: 20mm. **[12]**



All dimensions are in mm

b) Explain with neat sketch, Direct numerical control. State its advantages and limitations over CNC. **[6]**

Q9) a) Explain FMS. Describe the various layouts used in FMS. **[8]**

b) What are various work transfer mechanisms? Explain *GENEVA* mechanism with neat sketch. **[8]**

OR

Q10)a) Define an automation. Compare fixed, programmable and flexible automation. **[8]**

b) What do you understand by group technology? Explain various methods of grouping the parts into part families. **[8]**

Q11)a) Explain with neat sketch work envelope of cylindrical and *SCARA* Robot. **[8]**

b) Explain with neat sketches the use of robot in welding and material handling. **[8]**

OR

Q12)a) Define industrial robotics as per Robotic Industries Association (RIA). Explain with neat sketch the different degree of freedom available to a robot wrist. **[8]**

b) With a neat sketch, explain the use of magnetic grippers in robot. What are their advantages and limitations? **[8]**

Total No. of Questions : 12]

SEAT No. :

P2846

[Total No. of Pages : 5

[5354]-32

B.E. (Mechanical/Sandwich)

DYNAMICS OF MACHINERY

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Solve in Section - I :Q1 or Q2, Q3 or Q4, Q5 or Q6; Section - II: Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule and electronic pocket calculator is allowed.***
6) ***Assume suitable data wherever necessary.***

SECTION - I

Q1) a) Four masses A, B, C and D are completely balanced. Masses C and D make angles of 90° and 210° respectively with B in the same sense. The planes containing B and C are 300 mm apart. Masses A, B, C and D can be assumed to be concentrated at radii of 360 mm, 480 mm, 240 mm and 300 mm respectively. The masses B, C and D are 15 kg, 25 kg and 20 kg respectively. Determine: **[10]**

i) mass A and its angular position

ii) position of planes A and D.

b) With the help of neat sketch, explain the working of dynamic balancing of machine. **[6]**

OR

Q2) In a four stroke, five cylinders, inline reciprocating engine, the mass of the reciprocating parts per cylinder is 15 kg. The stroke is 200 mm, the length of connecting rod is 450 mm and the cylinders are spaced at 375 mm pitch. The Firing order of engine is 1-2-3-4-5 and the engine runs at 600 rpm.

Examine the engine for the balance of primary and secondary forces and couples. Determine the maximum values of these with reference to central plane of the engine. **[16]**

P.T.O.

Q3) a) Calculate frequency of damped oscillation of the system as shown in Fig.1 for the given values, m = 1750kg; C = 3500Ns/m; K=7×10^5 N/m; a = 1.25m; b = 2.5m. **[8]**

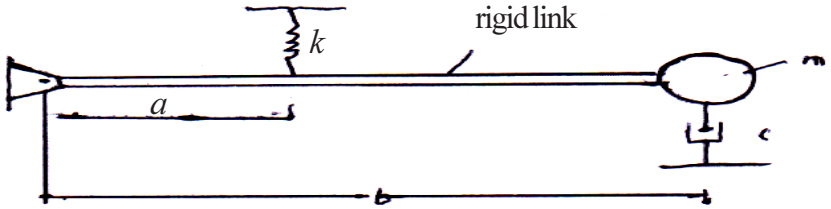


Fig. 1

b) Determine natural frequency for the given system as shown in Fig.2. **[8]**

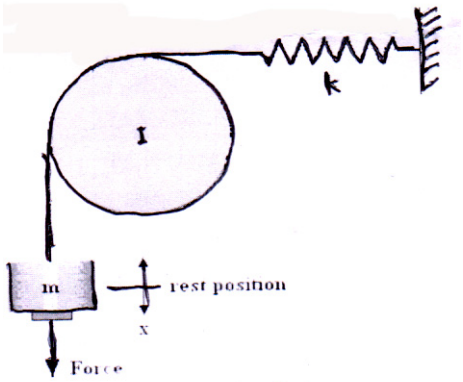


Fig.2

OR

Q4) a) Explain the term 'Vibration isolation' with practical example of any machine. State the suitable materials commonly used as vibration isolation. **[6]**

b) In a damped free vibration, mass is 2 kg and spring stiffness is 100 N/m. It is observed that an initial amplitude of 100 mm is reduced to 1 mm in 10 oscillations. Find **[10]**

i) The natural Frequency of vibrations

ii) The damping constant C

Q5) a) Explain following term : **[8]**

i) Under damped system

ii) Critical damped system

iii) Over damped system

iv) Critical damping coefficient.

b) A vertical single stage compressor has a mass of 500 kg mounted on springs having stiffness of 1.96×10^5 N/m and a dashpot having damping factor of 0.2 .The rotating parts are completely balanced and the equivalent reciprocating parts weigh 2 kg.The stroke of the compressor is 0.2 m. Find the dynamic amplitude of vertical motion and the phase difference between the motion and the excitation force, if the operating speed is 200 rpm ? **[10]**

OR

Q6) a) An automobile trailer which moves over the road surface making approximately sinusoidal profile with wavelength of 8 m and amplitude of 6 cm. Trailer is pulled on road surface with a velocity of 60 km/hr. Find the critical speed if the vibration amplitude is 1.5 cm and for trailer mass of 60kg. **[8]**

b) Write short note on any two of following : **[10]**

i) Vibration Absorber

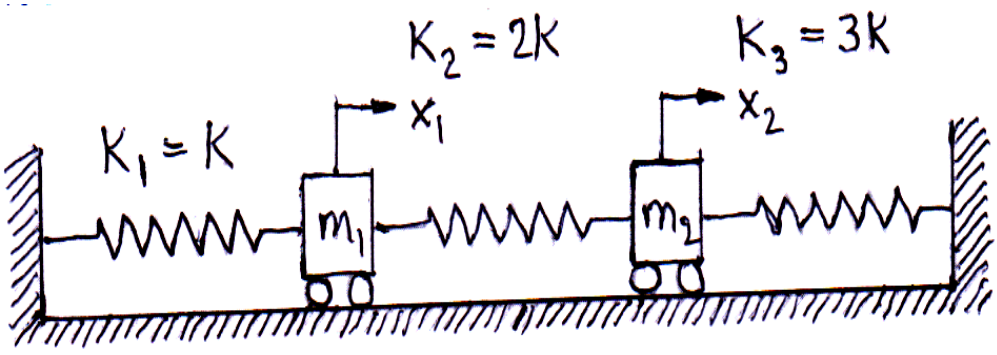
ii) Transmissibility

iii) Eddy current damping

SECTION - II

Q7) a) Determine natural frequencies and amplitude ratios for the system shown in following fig.3 Also draw the Principal mode shapes.

Take K=40N/m & m = 10 kg. ,$m_1 = m$, $m_2 = 2m$ **[12]**



b) Explain torsional vibrations of geared system. **[6]**

OR

Q8) a) Two rotors A and B as shown in fig.4 are attached to the ends of a shaft of 500 mm length. The mass of rotor A is 30.58 kg and its radius of gyration is 300 mm.The corresponding values for rotor B are 50.96 kg and 450 mm respectively. The shaft is 70 mm diameter for the first 250 mm, 120mm diameter for the next 100 mm length and 100 mm diameter for the remaining length. The modulus of rigidity of the shaft material is 0.8×10^5 MPa. Find the position of the node and the frequency of the torsional vibrations. **[12]**

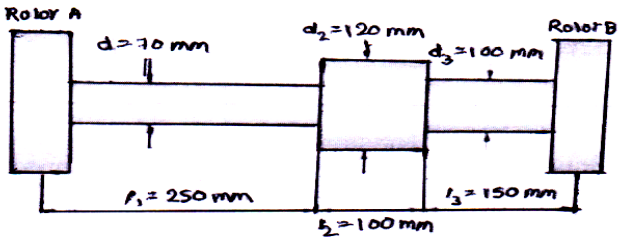


Fig.4

b) Explain whirling of shaft. **[6]**

Q9) a) What is sound field? What are the various types of sound fields in the vicinity of a sound source? **[4]**

b) Define the following terms : **[6]**

i) Sound power level

ii) Sound Intensity

iii) Sound pressure level

iv) Sound Intensity level

c) The set of measured values of sound pressure level at a point for a machine are: 96dB, 100 dB, 90 dB and 96 dB. Determine the average sound pressure level. **[6]**

OR

Q10)a) Explain the working of condenser microphone. **[4]**

b) What do you understand by sound enclosure? Describe the 2 types of sound enclosures. **[6]**

c) Explain human hearing mechanism with a neat sketch. **[6]**

Q11) a) Explain time domain and frequency domain analysis. **[4]**

b) What do you mean by vibration isolation? What are the various methods of vibration isolation? **[6]**

c) Explain noise control with respect to following points : **[6]**

i) Noise control at source.

ii) Noise control at receiver.

iii) Noise control in path.

OR

Q12) Write short notes on the following : **[16]**

a) Seismometer

b) Stroboscope

c) Piezo electric accelerometer

Total No. of Questions : 12]

SEAT No. :

P2847

[Total No. of Pages : 5

[5354]-33

B.E. (Mechanical)

INDUSTRIAL FLUID POWER

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from section I and 3 questions from section II.***
2) ***Answer to the TWO sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data whenever necessary.***

SECTION - I

Q1) a) Draw a simple hydraulic circuit showing all its essential components. State the function of each component. **[8]**

b) What are the additives and inhibitors used in hydraulic system? **[8]**

OR

Q2) a) State and explain types of contamination in a hydraulic system. **[8]**

b) What are the important properties of fluids to be considered while selecting an oil for fluid power system. **[8]**

Q3) a) What are different types of gear pump? Explain any one with neat sketch. **[9]**

b) What are the functions of reservoirs? Draw a neat sketch of a standard reservoir showing all its features. **[9]**

P.T.O.

OR

Q4) a) Classify the pumps and differentiate between positive displacement pump and non-positive displacement pump. **[10]**

b) What is necessity of an accumulator? State different types of accumulators and explain any one with neat sketch. **[8]**

Q5) a) Draw symbols for **[8]**

i) FRL unit

ii) Check valve

iii) Cooler

iv) Hydraulic accumulator

v) Silencer

vi) Shuttle valve

vii) Bi-directional pneumatic motor

viiii) Telescopic cylinder.

b) What is a function of pressure reducing valve? Explain its working with neat sketch. **[8]**

OR

Q6) a) Explain with neat sketch different center positions of direction control valves. Give advantages and disadvantages of each. **[8]**

b) What is meter-in and meter -out circuit? Draw and explain the advantages, limitations and applications of these. **[8]**

SECTION - II

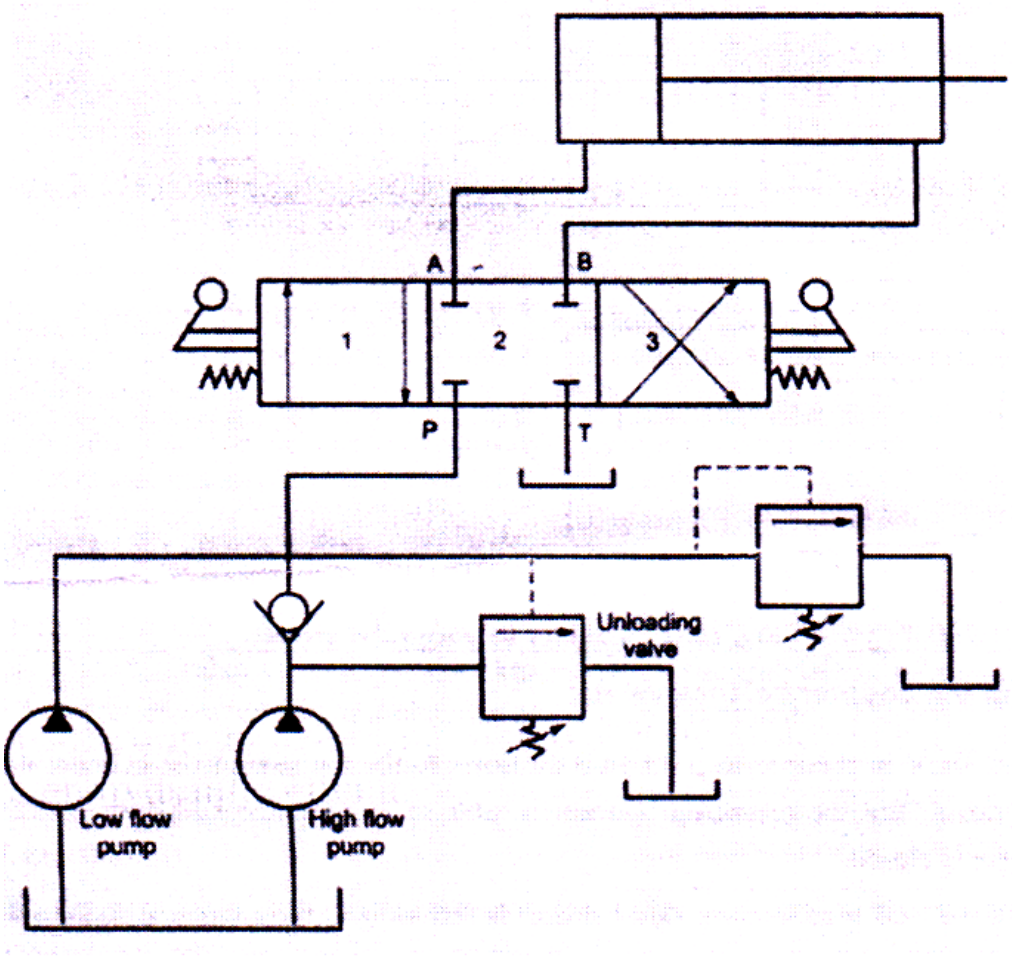
Q7) a) With the help of a simple circuit diagram explain the functioning of a regenerative circuit used in a hydraulic system. **[8]**

b) Describe the construction and working of telescopic cylinder. Mention any two applications of it. **[8]**

OR

Q8) a) Explain the construction and working of a hydraulic motor braking circuit. **[8]**

b) Analyze the given hydraulic circuit. **[8]**



Q9) a) What do you understand by the term FRL unit? Explain its functioning and highlight its importance. **[8]**

b) What is the purpose of quick-exhaust valve in a pneumatic system? Explain with a neat sketch of it, with a typical application. **[8]**

OR

Q10)a) Explain with a neat sketch the working of Lubricator unit used in pneumatic circuit. **[8]**

b) Explain the functioning of a twin pressure pneumatic valve with the help of a sketch. **[8]**

Q11)a) Draw a neat sketch and explain working of a 5 way 2 positions DCV used in pneumatic system. **[6]**

b) The two pneumatic cylinders Al and A2 are used in a machine. The sequence of operations is as follows **[12]**

i) Cylinder A1 advances completely after pressing knob of a 3/2 DCV.

ii) Cylinder A2 advances completely.

iii) Cylinder Al retracts.

iv) Cylinder A2 retracts.

Develop a pneumatic circuit for this application. Do not use solenoid operated valves.

OR

Q12)A hydraulic cylinder used to operate a machine has the following requirements : **[18]**

a) During the initial movement of 300 mm, it has a load of 30 kN and it should complete this distance in about 6 seconds.

b) This is followed by a slow working stroke of 100mm against a load of 50 kN which should be completed in 3 to 6 seconds. The time required is to be adjustable.

c) The return motion of 400 mm is against a load of 40 kN which should be completed in about 7 seconds. Use solenoid operated valves. Meter out circuit is used.

Draw a circuit to fulfill these requirements. Select different components you have used in the circuit from the given data. Mention the ratings of the components in case it is not available in the given data.

DATA SHEET

DATA

(a) Suction strainer:

Model	Flow Capacity (lpm)
S_1	38
S_2	76
S_3	152

(b) Pressure gauge:

Model	Range (bar)
PG_1	0 – 25
PG_2	0 – 40
PG_3	0 – 100
PG_4	0 – 160

(c) Vane pump:

Model	Delivery in lpm		
	At 0 bar	At 35 bar	At 70 bar
P_1	8.5	7.1	5.3
P_2	12.9	11.4	9.5
P_3	17.6	16.1	14.3
P_4	25.1	23.8	22.4
P_5	39.0	37.5	35.6

(d) Relief valve:

Model	Flow capacity (lpm)	Max. working pressure & bar
R_1	11.4	70
R_2	19.0	210
R_3	30.4	70
R_4	57.0	105

(e) Flow control valve:

Model	Working pressure (bar)	Flow range (lpm)
F_1	70	0 - 4.1
F_2	105	0 - 4.9
F_3	105	0 - 16.3
F_4	70	0 - 24.6

(f) Directional control valve:

Model	Max. working pressure & bar	Flow capacity (lpm)
D_1	350	19
D_2	210	38
D_3	210	76

(g) Check valve:

Model	Max. working Pressure & bar	Flow capacity (/pm)
C_1	210	15.2
C_2	210	30.4
C_3	210	76

(h) Pilot operated check valve:

Model	Max. working Pressure (bar)	Flow capacity (lpm)
PO_1	210	19
PO_2	210	38
PO_3	210	76

(i) Cylinder (Max. working pressure 210 bar)

Model	Bore diameter (mm)	Rod diameter (mm)
A_1	25	12.5
A_2	40	16
A_3	50	35
A_4	75	45
A_5	100	50

(j) Oil reservoirs:

Model	Capacity (litres)
T_1	40
T_2	100
T_3	250
T_4	400
T_5	600

Total No. of Questions : 12]

SEAT No. :

P2848

[Total No. of Pages : 3

[5354]-34

B.E. (Mechanical) (Part - I)

ENERGY AUDIT & MANAGEMENT

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from section I and 3 questions from section II.***
2) ***Answer to the two sections should be written in separate books***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables and time value of money factor table is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the principles of Energy Management. **[8]**

b) Describe Energy Security & Reliability. **[8]**

OR

Q2) a) Explain current Energy consumption pattern in Indian Industry. **[8]**

b) Write note on energy efficiency & methods for improvement of energy efficiency. **[8]**

Q3) a) What are the basic components of Energy Audit. **[8]**

b) Explain Energy conservation opportunities of cooling towers. **[8]**

OR

Q4) a) Describe different types of Energy Audit. **[8]**

b) How reporting of Energy Audit is done? **[8]**

P.T.O.

Q5) a) How you will determine cost of steam generated? **[8]**

b) Write short notes on. **[10]**

i) Time value of money.

ii) Internal rate of return. (IRR)

OR

Q6) a) Explain risk and sensitivity analysis. **[8]**

b) For next four years a company anticipates buying of Rs. 1,00,000 worth of particular part each year. If inflation is expected to be 3% per year, what are then current cash flow required to purchase particular part? **[10]**

SECTION - II

Q7) a) Calculate the efficiency of the boiler by direct method with the data given below: **[10]**

i) Type of boiler: Oil fired

ii) Quantity of dry and saturated steam generated: 6500kg/hr

iii) Quantity of fuel consumed: 482.25kg/hr

iv) Steam pressure and temperature: 10 kg/m^2 and 180°C

v) Feed water temperature: 66°C

vi) Gross calorific Value of oil: 43960kJ/kg

vii) Enthalpy of saturated steam at : 2776 kJ/kg

b) Explain the energy saving opportunities in fans and blowers. **[8]**

OR

Q8) a) Explain any one flash steam recovery system. **[8]**

b) What is a steam trap? Explain thermodynamic steam trap. **[10]**

Q9) a) The connected load for the hostel are as below **[8]**

i) 150 Fluorescent tubes of 55W each with magnetic ballast

ii) 25 Flurescent tubes of 40 W each with electronic ballast

iii) 20 old fan of 100 W each

It is decided to replace the all tubes by energy efficient fluorescent tubes of 20 W and cost of Rs.420 each.And old fan by new fan of 80W and cost of Rs. 1200. Considering usage of 8hours per day and an electrical tariff of Rs. 4 per KWh , calculate Simple Payback Period (SPP) of tubes and fans replacement.

b) Explain Different losses occurring in electric motor. **[8]**

OR

Q10)a) Define and explain Power Factor (PF). How PF is improved. List the benefits of PF improvement. **[8]**

b) Explain the following terms : **[8]**

i) Lux

ii) Luminous efficacy

iii) Luminance

iv) No load loss and load loss

Q11)a) What is a cogeneration? Describe technical options for cogeneration and write down advantages of cogeneration. **[8]**

b) Classify the waste heat recovery with example. Write down the benefits. **[8]**

OR

Q12)a) Explain topping cycle and bottoming cycle of cogeneration with example. **[8]**

b) Describe heat pipe used for waste heat recovery with neat sketch. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2849

[Total No. of Pages : 3

[5354]-35

B.E. (Mechanical Engineering) (Semester - I)

PRODUCT DESIGN AND DEVELOPMENT

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain design morphology of product design? **[10]**

b) Explain different factors in product design? **[8]**

OR

Q2) a) Write product development planning with reference to ISO? **[10]**

b) Write note on concurrent engineering? **[8]**

Q3) a) Write note on Technology S curve? **[8]**

b) Explain in detail about Economics Analysis of Product? **[8]**

OR

P.T.O.

Q4) a) Explain in detail steps involved in Analysis of Gathered Information? **[8]**

b) What is concept of customer need? **[8]**

Q5) a) Explain in detail brainstorming? **[8]**

b) Write in detail system modeling? **[8]**

OR

Q6) a) Explain is concept of augmentation and aggregation? **[8]**

b) Explain in detail Pugh's concept? **[8]**

SECTION - II

Q7) a) Write note on Reverse Engineering in detail? **[10]**

b) Explain in detail about trend analysis? **[8]**

OR

Q8) a) Write in detail setting product specifications? **[10]**

b) Explain the Tools Used In Benchmarking? **[8]**

Q9) a) What is concept design for manufacturing? **[8]**

b) Explain in detail basic DFE methods? **[8]**

OR

Q10)a) Write note on virtual trials? **[8]**

b) Explain in detail product testing? **[8]**

Q11)a) Write short notes on : **[8]**

i) Application of Product life cycle

ii) Concept of PLM

b) Write in detail about customer involvement? **[8]**

OR

Q12)a) Write note on Product data. **[8]**

b) What is importance of customer involvement? **[8]**

Total No. of Questions : 12]

SEAT No. :

P2850

[Total No. of Pages : 4

[5354]-36

B.E. (Mechanical Engineering)

DESIGN OF PUMPS, BLOWERS AND COMPRESSORS

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.1O, Q.11 or Q.12.***
2) ***Answer Three questions from section I and Three questions from section II***
3) ***Answer to the two sections should be written on separate.***
4) ***Neat diagram must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the difference between fan, blower & Compressor. **[8]**

b) Write a note on stage velocity triangle. **[8]**

OR

Q2) a) What is specific speed? Explain its significance. **[8]**

b) Explain dimensional analysis for compressible and incompressible flow machines. **[8]**

Q3) a) Explain various efficiencies of centrifugal pump. **[8]**

b) Draw operating characteristics curves for reciprocating pump. **[8]**

OR

P.T.O.

Q4) a) Write down steps involved in calculation of axial thrust methods to minimize axial thrust. **[8]**

b) Enlist different applications of rotary & reciprocating pumps. **[8]**

Q5) a) Explain design procedure of centrifugal pumps. **[10]**

b) Explain various forms of corrosion occur in hydraulic machines. **[8]**

OR

Q6) a) Enlist steps for selection of impeller and casing dimension using industrial manuals for hydraulic design of pumps. **[10]**

b) Explain various applications areas of centrifugal pump. **[8]**

SECTION - II

Q7) a) Explain design procedure & selection, optimization of blower. **[8]**

b) Write a short note on "Applications of Fans & Blowers". **[8]**

OR

Q8) a) What are main cause for noise generation? What are methods for reducing the fan noise? **[8]**

b) How does dust erosion of centrifugal impeller occurs? What is its effect on the Performance? **[8]**

Q9) a) State design consideration and imperial relations used to determine various for design Parameters in fan & blowers? **[8]**

b) Explain the functions of an aerofoil and discuss the characteristics curves of airfoils. **[8]**

OR

Q10)a) Write a short note on " Design procedure for selection and optimization of Blowers" **[8]**

b) Write a short note on "Surge & stall and Cascade Variable" **[8]**

Q11)a) Explain the terms degree of reaction & Slip factor? **[8]**

b) An Axial compressor stage has the following data **[10]**

i)	Temperature and Pressure at Entry	300 K, 1.0 bar
ii)	Degree of Reaction	50%
iii)	Mean Blade ring diameter	36cm
iv)	Rotational Speed	18000 rpm
v)	Blade Height at entry	6cm
vi)	Air angles at rotor and stator exit	25°
vii)	Axial velocity	180 m/s
viii)	Work done factor	0.88
ix)	Stage Efficiency	85 %
x)	Mechanical Efficiency	96.7%

Determine:-

i) Air angles at the stator and rotor entry

ii) The mass flow rate of air

iii) The power required to drive the compressor

iv) The loading coefficient

v) The pressure ratio developed by the stage

vi) Mach number at the rotor entry.

OR

Q12)a) Draw the velocity triangles at the entry and exit for the following : **[8]**

axial compressor stage : -

i) R = ½

ii) R < ½

iii) R > ½

b) Air enters the inducer of centrifugal compressor at Po1 = 1.02 bar, Tol = 335 K. The hub and tip diameters of the impeller eye are 10 and 25cm respectively. If the compressor runs at 7200 rpm and delivers 5.0 kg/s of air. Determine the air angle at the inducer blade entry and the relative Mach number. If IGVs are used to obtain a straight inducer section, determine the air angle at IGVs exit and the new value of the relative mach number. **[10]**

Total No. of Questions : 12]

SEAT No. :

P2851

[Total No. of Pages : 3

[5354]-37

B.E. (Mechanical)

TRIBOLOGY

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Discuss the methods to reduce tribological problems in design stage. **[6]**

b) Enumerate the desirable properties of lubricant. **[8]**

c) Compare load carrying capacity of hydrodynamic, hydrostatic and rolling contact bearings with the help of graph. **[2]**

OR

Q2) a) Explain the effect of temperature and pressure on viscosity of the lubricant. **[8]**

b) Explain the importance of recycling of used oil. **[8]**

Q3) a) Derive the equation for volume of abrasive wear with usual notations. **[8]**

b) Using deformation theory. derive the equation for coefficient of friction with usual notations. **[8]**

P.T.O.

OR

Q4) a) Explain the following theories of friction : **[12]**

i) Mechanical Interlocking theory.

i) Simple Adhesion theory.

iii) Modified Adhesion theory.

b) What are the factors affecting wear. **[4]**

Q5) a) With the usual notations, derive an expression for pressure distribution in case of infinite short Journal bearing. Show the axial and circumferential pressure distribution. **[12]**

b) Write a short note on following : **[6]**

i) Hydrodynamic bearings Advantages and Limitations.

ii) Sommerfield number.

OR

Q6) a) Explain different regimes of hydrodynamic lubrication with the help of Stribeck curve. **[8]**

b) Derive the equation for pressure distribution of infinitely short journal bearings with usual notations. State the assumptions made. **[10]**

SECTION - II

Q7) a) Derive expression for flow rate through ractangular slot. State the assumptions while deriving the equation. **[10]**

b) State and explain different types of energy losses in hydrostatic bearings. **[6]**

OR

Q8) a) Derive the expression for load carrying capacity and time of approach in case of two parallel circular plates separated by a fluid film. **[8]**

b) A circular plate of 60mm radius is approaching the base plane at a velocity of 150 mm/sec at the instant when the oil film thickness is 0.2mm. If the absolute viscosity oil is 0.025 Pa-sec calculate. **[8]**

i) Load carrying capacity of the oil film at given instant

ii) Maximum pressure

iii) Average pressure

Q9) a) Explain the principle and applications of Elastohydrodynamic Lubrication. **[6]**

b) Write short note on Hertz theory and Ertel-Grubin Theory. **[10]**

OR

Q10)a) State the advantages and limitations of gas lubricated bearings. **[8]**

b) What is self lubricating bearings? Discuss the property of any two materials which are used for making self lubricating bearings. **[8]**

Q11)a) Explain the considerations while selecting a Lubricant for metal working. **[8]**

b) Discuss the development of concept and structure of superficial layers. **[10]**

OR

Q12)Write short note on any three of the following : **[18]**

a) Metal spraying

b) Lubrication requirement in case of Extrusion

c) Cladded coatings

d) Lubrication requirement in case of Rolling.

Total No. of Questions : 12]

SEAT No. :

P2852

[Total No. of Pages : 4

[5354]-38

B.E. (Mechanical Engineering)

AUTOMOBILE ENGINEERING

(2008 Pattern) (Elective - II) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from section-I and 3 questions from section -II.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figure to the right indicates full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain with neat sketch layout of fourwheel drive. **[8]**

b) Discuss various types of vehicles bodies giving examples. **[8]**

OR

Q2) a) Compare merits and demerits of the frameless construction with those of the convectional framed construction. **[8]**

b) Classification of an automobile. **[8]**

Q3) a) Explain with neat sketch of multiple clutch. Write advantages over the single plate clutch. **[8]**

b) With the help of suitable diagram, describe the electromagnetic & vacuum operated clutch. **[8]**

OR

P.T.O.

Q4) a) Enlist the different types of transmission & explain any one. Explain clearly the necessity of a transmission in a vehicle. **[8]**

b) Explain with neat sketch of torque converter. Differentiate between the torque converter and fluid flywheel. **[8]**

Q5) a) Explain the terms: Steering Axis Inclination, Castor, toe out and combined angle &scrub radius. What are the effects of each on the steering characteristics of a vehicle? **[9]**

b) Explain the necessity of power steering in an Automobile. Sketch any power steering system & explain its working. **[9]**

OR

Q6) a) Describe the constructional features of the tubed and tubeless tyres for automotive use. **[8]**

b) Discuss with neat sketch of different tyres carcass types & the materials used. **[6]**

c) Differentiate between the live and dead axle. **[4]**

SECTION - II

Q7) a) Differentiate clearly between the function of a spring and shock absorber. Explain the construction and working of a telescope type of shock absorber with the help of neat diagram. **[8]**

b) Explain briefly the action of air springs. Draw the schematic diagram showing the layout of an air suspension system & describe the same. **[8]**

OR

Q8) a) Explain the function of a brake adjuster. Describe with sketch in details the construction & working of drum brake. **[8]**

b) Describe with the help of neat sketch operation of a 'Wheel Cylinder' fitted in the braking system of a car. **[8]**

Q9) a) Describe with neat sketch Bendix drive. How does it differ from Folo-thru drives? **[9]**

b) Explain with the help of circuit diagram the Flasher unit used in lighting system. **[9]**

OR

Q10) Write a short note on the following (Any three): **[18]**

a) Sensors and Actuators

b) Speedometer & Odometer

c) Battery Rating

d) Electronic Stability Control

e) Hybrid Drives

Q11) a) Derive the expression for power requirement for propulsion of vehicle. **[6]**

b) Explain the ergonomic consideration for vehicle. **[6]**

c) What are the different factors considered which oppose the motion of the vehicle. **[4]**

OR

Q12) a) Discuss in briefly various 'state of Art' vehicle safety system. **[6]**

b) A motor car weight 7975.53 N and its engine develops B.P. 14.71 kW at 2700 rpm. At this engine speed the road speed of the car on top gear is 64.37 Km/Hr. Bottom gear reduction 3.5:1 and the efficiency of transmission is 86% on top and 80% on bottom gear. The diameter of tyre is 0.762 m and the projected frontal area of the vehicle is 1.116 m^2. The coefficient of air resistance is 0.0032 and $R=KAV^2$, where R is resistance in N, K is coefficient of resistance, A is front area in m^2 and V is speed in Km/Hr., Road resistance is 0.2256 N/N. **[10]**

Calculate :

i) Speed of car on bottom gears

ii) Tractive effort available at the wheels on top and bottom gears

iii) Gradient which car can climb on bottom gear

iv) The tractive force at the wheel required to start up the car on the level and attain a speed of 48.28 km/Hr. in 10 seconds (Average air resistance may be taken as half the maximum and accelerating force to vanish at 48.28 Km/Hr. speed).

Total No. of Questions : 8]

SEAT No. :

P2824

[Total No. of Pages : 3

[5354] - 4
B.E. (Civil)
STRUCTURAL DESIGN OF BRIDGES
(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
2) *Figures to the right indicates full marks.*
3) *IRC-6, 83,112 and IS 456-2000, IS1343 are allowed.*
4) *Assume suitable data wherever necessary.*
5) *Use of non programmable calculator is allowed.*

SECTION - I

Q1) a) Classify the bridges according to materials used and draw the sketches. **[10]**

b) Differentiate between steel bridges and RCC bridges. **[10]**

c) Explain scour depth of a bridge. **[5]**

OR

Q2) a) Explain IRC loadings with suitable examples. **[10]**

b) Explain the different types of bearing used in R.C. bridges. **[10]**

c) Explain impact load. How it is calculated for R.C. bridges. **[5]**

Q3) An R.C. T-Beam deck slab bridge shown in Fig. 3 has the following details. **[25]**

a) Thickness of railings - 100 mm.

b) Thickness of footpath - 150 mm.

c) Thickness of wearing coat - 80 mm.

d) Span of main girder - 25.0 m.

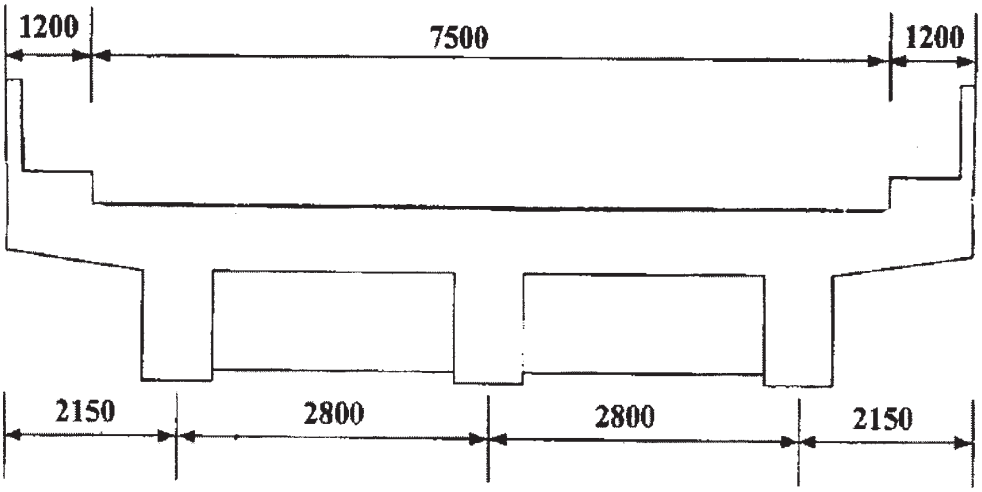
e) Spacing of cross-beams - 3.0 m c/c.

f) Live load - IRC Class AA Tracked Vehicle.

P.T.O.

g) Materials - M30 grade of concrete and Fe 500 grade of steel Adopt m1 = 0.082 and m2 = 0.059.

Design the deck slab and also sketch the details of reinforcement.



(dimensions are in mm)

OR

Q4) For the R.C.T-Beam deck Slab Bridge given in Q.3, design the intermediate post-tensioned prestressed girder. Use M50 grade of concrete and high tension strands of 9 ply 15.2 mm diameter having an ultimate tensile strength of 1700 N/mm^2. Use Fe 500 steel for supplementary reinforcement.

Consider loss ratio as 0.85. Sketch the cable profile for the girder. **[25]**

SECTION - II

Q5) a) Explain in brief the advantages of steel bridges. **[12]**

b) Explain in brief with neat sketches the various types of railway steel bridges. **[13]**

OR

Q6) a) Design a rocker and roller bearing for the given data. **[18]**

i) Reaction from the girder = 1700 kN.

ii) Allowable pressure on bearings = 8N/mm^2.

iii) Allowable pressure on bearing plate = 2000 N/mm^2.

iv) Allowable pressure on concrete bed = 7 N/mm^2 Sketch the details.

b) What are the factors considered during the selection of bearing for steel bridges? **[7]**

Q7) Using channel sections, design the members U2-U3, U2-L3 and U3-L3 for the railway steel truss bridge shown in Fig. 7. Also draw a neat sketch of the connection of members at U3. **[25]**

a) Weight of stock rail - 0.70 kN/m.

b) Weight of check rail - 0.50 kN/m.

c) Timber sleepers of size - (0.25 x 0.25 x 2.5) m @ 0.45 M c/c.

d) Unit weight of timber - 7.0 kN/m^3

e) Spacing of truss - 4.0 m c/c.

f) The bridge supports a Eudl of 3150 kN.

Assume height of truss is 5.0 m

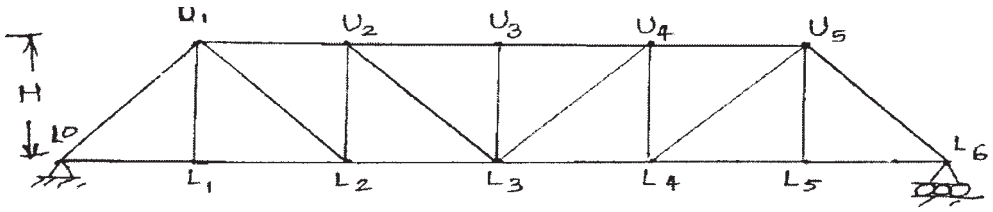


Fig.7 6panels @4m each

OR

Q8) For the railway bridge shown in Fig. 7, design the top and bottom lateral bracing with the given data. The rails are 850 mm above the c.g. of bottom chord. The chord members are 500 mm deep and 600 mm wide. The end posts are 475 mm deep and 475 mm wide. The web members are 475 mm deep and 240 mm wide. **[25]**

Total No. of Questions : 12]

SEAT No. :

P2853

[Total No. of Pages : 6

[5354]-40

B.E. (Mechanical)

QUANTITATIVE AND DECISION MAKING TECHNIQUES

(2008 Pattern) (Semester - I) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *All the questions are compulsory.*
2) *Two separate answer books are used for Section I and Section II.*
3) *Figures to the right side indicate full marks.*
4) *Use of calculator is permitted.*
5) *Assume suitable data if necessary.*

SECTION - I

Q1) a) Explain the steps in Decision Theory Approach. **[6]**

b) Reduce the following game by dominance and find the game value. **[10]**

		Player B				
		I	II	III	IV	V
Player A	I	1	3	2	7	4
	II	3	4	1	5	6
	III	6	5	7	6	5
	IV	2	0	6	3	1

OR

Q2) a) Explain: Saddle Point and Optimal Strategy. **[6]**

b) Solve the following (2×3) game & find the optimum strategies & value of game. **[10]**

		B		
		I	II	III
A	I	6	4	3
	II	2	4	8

P.T.O.

Q3) a) Distinguish between slack, surplus & artificial variable. **[6]**

b) A Firm uses lathes, milling machines and grinding machines to produce two machine parts. Table represents the machining times required for each part, the machining times available on different machines and the profit on each machine part. **[10]**

Types of Machine	**Machining time required for the machine part (minutes)**		**Maximum time available per week (minutes)**
	I	**II**	
Lathes	12	6	3000
Milling Machines	4	10	2000
Grinding Machines	2	3	900
Profit per unit	Rs. 40	Rs. 100	

Find the number of parts I and II to be manufactured per week to maximize the profit.

OR

Q4) a) Explain advantages of Linear Programming Models. **[6]**

b) Solve L.P.P. by Simplex Method. **[10]**

Maximize : $Z = 2x_1 + 3x_2 + 10x_3$

Subject to $x_1 + 2x_3 = 0$

$x_2 + x_3 = 1$

$x_1, x_2, x_3 \geq 0$

Q5) a) What is the unbalanced assignment problem? How it is solved by Hungarian Method? **[6]**

b) Find the optimum solution the following transportation problem in which the cells contain the transportation cost in rupees. **[12]**

	W_1	W_2	W_3	W_4	W_5	Available
	68	35	4	74	15	18
	57	88	91	3	8	17
	91	60	75	45	60	19
	52	53	24	7	82	13
	51	18	82	13	7	15
Required	16	18	20	14	14	82

OR

Q6) a) Discuss the similarities & difference between the transportation & assignment problem. **[6]**

b) Solve the following assignment problem : **[12]**

	I	II	III	IV	V
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	13

SECTION - II

Q7) a) Explain Monte Carlo Simulation with applications. **[6]**

b) In the central railway station 15 computerized reservation counters are available. A customer can book his/her ticket in any train on any day in any one of these computerized reservation counters. The average time spent per customer by each clerk is 5 minutes. Average arrivals per hour during three types of activity periods have been calculated and customers have been surveyed to determine how long they are willing to wait during each type of period. **[10]**

Type of period	**Arrivals/hr.**	**Customer's acceptable waiting time**
Peak	110	15 minutes
Normal	60	10 minutes
Low	30	5 minutes

Making suitable assumptions on this queuing process, determine how many counters should be kept open during each type of period.

OR

Q8) a) Explain assumptions and limitations of Queuing model. **[6]**

b) A colliery working one shift per day uses a large number of locomotives which break down at random intervals, on average one failing per 8-hour shift. The fitter carries out a standard maintenance schedule on each faulty locomotive. Each of the 5 main parts of this schedule takes an average of ½ hour but the time varies widely. How much time will the fitter have for other tasks and what is the average time a locomotive is out of service? **[10]**

Q9) a) Describe the replacement of items that fail suddenly. **[6]**

b) The yearly cost of two machines A & B, when money value is neglected is shown in table below. Find their cost patterns if money value is 10% per year and hence find which machine is more economical. **[10]**

Year	1	2	3
Machine A (Rs.)	1,800	1,200	1,400
Machine B (Rs.)	2,800	200	1,400

OR

Q10)a) Explain IRR method & Pay Back Period method. **[6]**

b) A taxi owner estimates from his past records that the costs per year for operating a taxi whose purchase price when new is Rs. 60,000 are as give below. **[10]**

Age	1	2	3	4	5
Operating Cost (Rs.)	10,000	12,000	15,000	18,000	20,000

After 5 years, the operating cost is Rs. 6,000 K, where K = 6, 7, 8, 9, 10 (K denoting age in years). If the resale value decreases by 10% of purchase price each year, what is the best replacement policy?

Q11)a) Explain CPM and PERT. **[6]**

b) The utility data for a network are given below. Determine the total, free. independent and interfering floats and identify the critical path. **[12]**

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7
Duration	2	8	10	6	3	3	7	5

OR

Q12)a) Explain deterministic sequential decision making. **[6]**

b) A civil engineering firm has to bid for the construction of a dam. The activities and their time estimates are given below: **[12]**

Activity	Most Optimistic Time	Most Pessimistic Time	Most Likely Time
1-2	14	25	17
2-3	14	21	18
2-4	13	18	15
2-8	16	28	19
3-4(dummy)	0	0	0
3-5	15	27	18
4-6	13	21	17
5-7(dummy)	0	0	0
5-9	14	20	18
6-7(dummy)	0	0	0
6-8(dummy)	0	0	0
7-9	16	41	20
8-9	14	22	16

Construct PERT network. Find the critical path and variance for each event. Find the project duration at 95% probability.

Given that for :

$Z = 1$; $P = 0.8431$,

$Z = 1.33$; $P = 0.9082$,

$Z = 1.65$; $P = 0.95$.

Total No. of Questions : 12]

SEAT No. :

P2854

[Total No. of Pages : 3

[5354]-41

B.E. (Mechanical Engineering)

POWER PLANT ENGINEERING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of logarithmic tables, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What factors should be taken into consideration while selecting the site for Steam Power Plant? **[8]**

b) List Various types of Tariff and explain Block rate Tariff and Two Part Tariff. **[8]**

OR

Q2) a) Explain role of Government Organizations and Private Organizations in Powergeneration in India. **[8]**

b) The Power plant data is as follows : **[8]**

Load factor = 70%, Capacity Factor = 60% and Use Factor = 65%

The power plant has a maximum demand of 50,000 kW, Find:

i) Annual Energy generation

ii) Reserve Capacity above peak load

iii) Hours per year, the plant is not in use.

P.T.O.

Q3) a) What are the functions of Condenser used in steam power plant? Explain Jet Condenser with Schematic diagram. **[8]**

b) What are different types of fluidized bed boilers? Explain Pressurized fluidized bed boiler. **[8]**

OR

Q4) a) Explain the working of electrostatic precipitator with a neat diagram and list Out it's outstanding features over other collectors. **[8]**

b) A vacuum of 700 mm of Hg was maintained in a condenser when barometer reads 754 mm of Hg. The mean temperature in the condenser is 22°C. Determine the vacuum efficiency and mass of air associated with 1kg of Steam. **[8]**

Q5) a) What do you understand by hydrograph and flow duration curve? Explain With diagrams. **[8]**

b) Discuss briefly the methods employed for improvement of thermal efficiency of open cycle gas turbine power plant. **[10]**

OR

Q6) a) Classify hydro-electric power plants. Explain Pumped storage plant with Schematic diagram. **[8]**

b) The following particulars refer to gas turbine cycle.

Air entry at 0.98 bar, 20°C

Compressor discharge pressure = 4.2 bar

Turbine inlet temperature = 850°C

Efficiency of compressor and turbine = 80% each

Calculate thermal efficiency of actual and theoretical.cycles. **[10]**

SECTION - II

Q7) a) Draw a typical layout of diesel power plant station and explain it. **[8]**

b) Write a short note on nuclear fission. **[8]**

OR

Q8) a) Explain with neat sketch BWR, also mention merits and demerits of BWR. **[8]**

b) Write a short note on nuclear waste disposal. **[8]**

Q9) a) Discuss the advantages of hydrogen cooling over air cooling in large capacity generators. **[8]**

b) Write a short note on following. **[8]**

i) Circuit Breaker

ii) Switch gear

OR

Q10)a) Explain single basis and double basis tidal power plant with the help of neat sketches. **[8]**

b) Describe the working of solar power plant. Give its advantages. **[8]**

Q11)a) Explain the noise pollution caused by thermal power plant and its control. **[8]**

b) What are the different pollutants due to thermal power plants and explain their effects on human health. **[10]**

OR

Q12)a) Write a short note on following. **[10]**

i) Oxides of nitrogen

ii) Oxides of Sulphur

b) Explain green house effect. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2855

[Total No. of Pages : 5

[5354]-42
B.E. (Mechanical)
MECHANICAL SYSTEM DESIGN
(2008 Pattern)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***
7) ***Your answers, will be valued as a whole.***

SECTION - I
UNIT - I

Q1) a) With neat sketches explain different types of pressure vessel supports. **[8]**

b) A high pressure cylinder consists of steel tube with inner and outer diameters of 45mm and 65mm respectively. It is jacketed by outer steel tube with an outer diameter 85mm. The tubes are assembled by shrinking process in such a way that maximum principal stress induced in any tube is limited to 150N/mm^2. Calculate the interference pressure and original dimensions of tubes, Assume E = 207000 N/mm^2. **[10]**

OR

Q2) a) Explain different methods of pre-stressing a cylinder. **[6]**

b) A cylindrical pressure vessel of 1500mm ID is provided with a nozzle of 330mm inner diameter and 10mm thickness. Protruding lengths of nozzle inside and outside the vessel are 10mm and 40mm respectively and it is made up of seamless tube. The thickness of shell is 20mm. Internal pressure in the shell is 5MPa. The corrosion allowance is 2mm. Permissible tensile stress for shell and nozzle material is 200MPa.

Design the dimensions of reinforcing pad if required. The reinforcing material is of same quality as that of the shell and is available in thickness of 18mm.(Assume weld efficiency as 90%) **[12]**

P.T.O.

UNIT - II

Q3) a) Explain the step by step procedure for designing of cylinder of IC engine. **[6]**

b) Determine the dimensions of the cross section of the connecting rod for a diesel engine with following data: **[10]**

Cylinder bore = 95mm

Length of connecting rod= 350mm

Maximum gas pressure = 4 MPa

Factor of safety = 5

OR

Q4) a) Explain the procedure for designing of crank shaft of IC engine. **[6]**

b) Cylinder of four stroke diesel engine has following specifications: **[10]**

Cylinder bore = 145mm

Cylinder material = FG200

Maximum gas pressure = 3.5 MPa

Factor of safety = 6

Poisson's ratio = 0.25

Determine thickness of cylinder wall and calculate stresses in the cylinder wall

UNIT - III

Q5) A tensile bar of length 600mm is subjected to constant tensile force of 4000N. If the factor of safety is 3, design the bar diameter, using Johnson's method, with the objective of minimizing material weight using optimum material from the list given in Table 1. **[16]**

Material	Density (ρ) Kg/m^3	Cost (c) Rs/Kg	Syt N/mm^2
Steel	7800	28	400
Aluminum alloy	2800	132	150
Titanium Alloy	4500	2200	800

Table 1

OR

Q6) a) Explain the method of solving optimum design problem with redundant specifications **[12]**

b) Differentiate between optimum and adequate design. **[4]**

SECTION - II

UNIT - IV

Q7) a) It is observed from a sample of 1000 bearings bushes that the internal diameters are normally distributed with mean of 50.015 mm and standard deviation of 0.008mm. Dimension of this diameter specified on drawing is 50.01±0.1mm. Calculate the approximate number of rejected bushes from that sample. **[12]**

Refer Table No: 01 for the Areas under normal distribution curve from Z = 0 to Z

Z	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
Area	0.3413	0.3849	0.4192	0.4452	0.4641	0.4772	0.4861	0.4918	0.4953	0.4974	0.4987

b) Justify that the Display and Control elements of a car are designed based on the ergonomic considerations. **[4]**

OR

Q8) a) Transmission shafts are manufactured on a machining center. The designer has specified the dimension of OD as 40±0.04mm. The natural tolerance is normally distributed with mean of 40mm but only 34% out of the manufactured shafts are found to be acceptable. So what is the standard deviation of this manufacturing process? **[10]**

Refer Table No: 01 above for the Areas under normal distribution curve from Z = 0 to Z

b) Explain the design considerations for Design of Forgings. **[6]**

UNIT - V

Q9) a) Justify the statement : 'All the structure formulae of the form $N = P_1(S_1).P_2(S_2)$ .....$P_n(S_n)$ can not be converted into structure diagrams and hence are not feasible' **[4]**

b) Decide the number of teeth of all gears from a 9 speed gearbox with speeds starting from 100 rpm and based on R5, to transmit 10KW power from a motor running at 1440rpm. (Assume that the minimum number of teeth in all stages is 20 and that the design is based on symmetric structure diagram only). **[10]**

Draw the deviation diagram of designed gearbox. **[4]**

OR

Q10)a) Justify the statement: 'The gap between two fixed gears from a sliding mesh gear box must be greater that two times the face width of those gears'. **[6]**

b) Draw Structure Diagrams for following structure formulae, find out optimum formula out of them and draw the gearing diagram for the optimum formula: **[12]**

2(1)3(2), 2(3)3(1), 3(1)2(3), 3(2)2(1)

UNIT - VI

Q11)a) Explain the following in connection with material handling systems: **[6]**

i) Unit Load

ii) Containerization

iii) Objectives of material handling systems

b) What are the guidelines for the selection of material handling systems.**[4]**

c) A horizontal belt conveyor is to be used for transporting 450 tons of iron ore with mass density 1750kg/m^3 If surcharge factor is 0.06 Determine belt width. **[6]**

OR

Q12) Following data relate to a horizontal belt conveyor used for conveying coal in a thermal power station : **[16]**

Capacity of conveyor : 1200 ton/hr

Density of coal : 700 Kg/m^3

Belt speed: 1.4m/s

Surcharge factor: 0.1

Number of plies : 4

Material Factor K1 : 2

Belt tension and contact factor K2 : 100

Material conveying length: 355m

Center distance between snub pulleys: 350m

Ratio of tail pulley to drive pulley dia : 1.0

Ratio of snub pulley to drive pulley dia. : 0.5

Mass of each carrying run idler: 25 kg

Mass of each return run idler: 20kg

Pitch of carrying run idlers: 1m

Pitch of return run idlers: 2.5m

Friction factor for idlers; 0.02

Snub Factor for snub pulleys: 0.03

Snub factor for Drive and tail pulleys: 0.06

Material velocity component along belt drive; 1 m/s

Angle of lap on drive pulley: 200°

Coefficient of friction between belt and pulley; 0.4

Drive efficiency: 93 %

Mass of belt / mm width / mm length = .015kg/mm/m

Motor speed 1440 RPM

Determine following parameters of the conveyor:

Standard belt with rounded off to nearest hundred mm.

Reduction ratio of the gear reducer

Power required to drive the conveyor.

Total No. of Questions : 12]

SEAT No. :

P2856

[Total No. of Pages : 7

[5354]-44

B.E. (Mechanical)

FINITE ELEMENT METHOD

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator is allowed.***
4) ***Assume suitable data if necessary.***
5) ***Additional data sheet is attached for the reference.***

SECTION - I

UNIT - I

Q1) a) Determine the half bandwidths of the plane trusses shown in below Figure 1 (a) and 1 (b). Which node numbering system i.e. as shown in Figure 1 (a) or 1 (b), will give minimum bandwidth? What conclusions can you draw regarding numbering of nodes? **[8]**

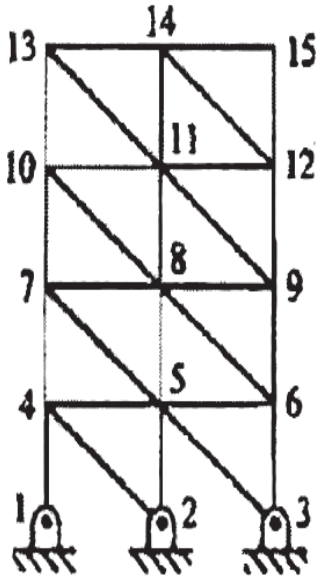


Figure 1 (a)

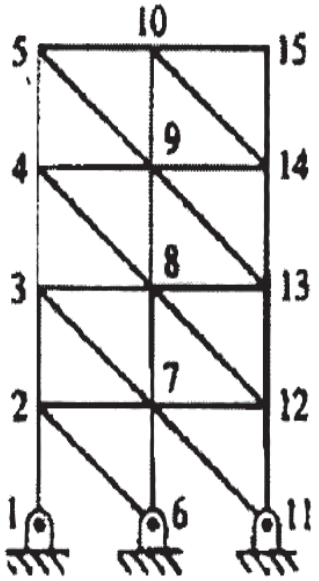


Figure 1 (b)

P.T.O.

b) What are advantages & disadvantages of finite element method? List out application areas of finite element method in engineering field. **[8]**

OR

Q2) a) With the help of neat sketch explain plane stress, plane strain and axisymmetric formulations in elasticity? Give practical examples of each. Also state stress-strain relations for these cases. **[12]**

b) What are essential and natural boundary conditions? Explain with example. **[4]**

UNIT - II

Q3) a) Derive the temperature load vector for one dimensional linear element. **[6]**

b) Calculate nodal displacement and element stresses for the truss shown in Figure 2. Given: Elastic Modulus E = 70GPa. Cross sectional area A = $2cm^2$ for all truss members. **[10]**

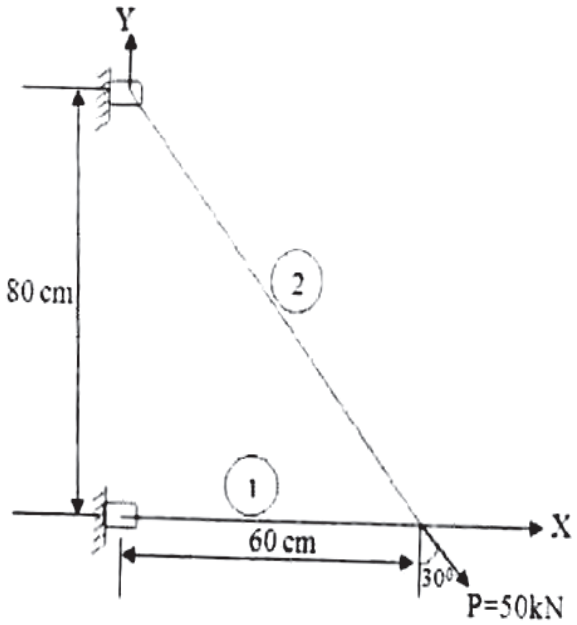


Figure 2

OR

Q4) Determine slope and deflection for the beam shown in Figure 3. Given: Elastic Modulus E = 200 GPa, $I_1 = 4 \times 10^{-6}m^4$ and $I_2 = 2 \times 10^{-6}m^4$. **[16]**

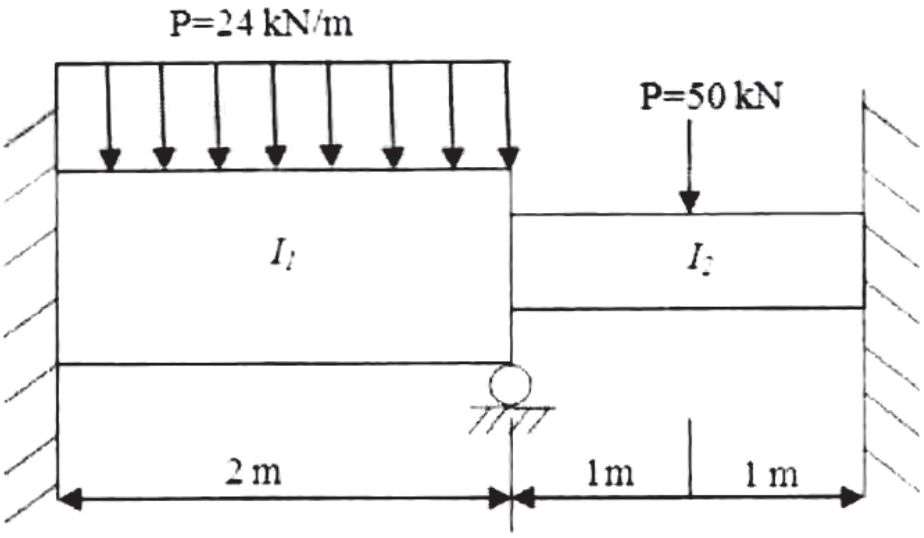


Figure 3

UNIT - III

Q5) a) Using Lagranges interpolation functions obtain the shape function for **[4]**

i) Liner and Quadratic bar element

ii) Nine node rectangular element

Use natural coordinate system varying from –1 to +1. **[8]**

b) Write a short note on p and h refinements. **[6]**

OR

Q6) a) Explain the terms sub-parametric, iso-parametric and super-parametric elements. **[6]**

b) Evaluate the following integrals using Gaussian Quadrature method. **[8]**

i) $I = \int_4^6 \int_{-2}^{2} (1-x)^2 (4-y)^2 \, dxdy$ **[4]**

ii) $I = \int_{-1}^{1} \left(3\xi^2 + \xi^3\right) d\xi$

SECTION - II
UNIT - IV

Q7) a) Derive elemental stiffness matrix formulations for one dimensional steady state heat conduction problems. **[8]**

b) Find the nodal temperatures in a composite wall shown in Figure 4. The wall is maintained at 100°C at the left face and convection mode of heat transfer occurs between the right face and the existing fluid. Given: thermal conductivities, k_1= 0.06 W/cm °C, k_2 = 0.2 W/ cm °C. Convection coefficient of heat transfer between walls and fluid h = 0.1 W/cm^2 °C and T_f = 25 °C. Area A = 1 cm^2 perpendicular to the direction of heat flow. **[10]**

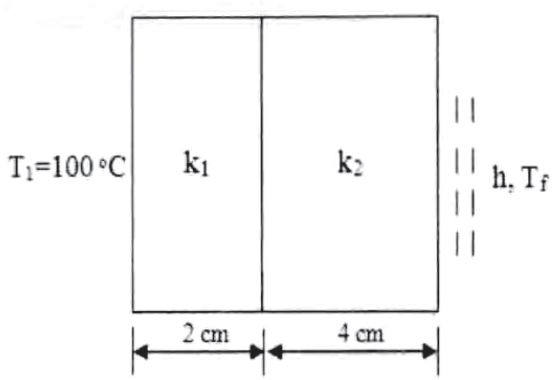


Figure 4

OR

Q8) a) Derive elemental stiffness matrix (conduction + convection) formulations for ID steady state heat transfer problems. **[8]**

b) Determine the temperature distribution in one dimensional fin, having rectangular cross-section as shown in Figure 5 and is 8 cm long, 4 cm wide and 1 cm thick. Assume that convection heat loss occurs from the end of the fin. Take h=3 W/cm °C, h = 0.1 W/cm^2 °C and T_∞ = 20°C. Model fin using two elements. **[10]**

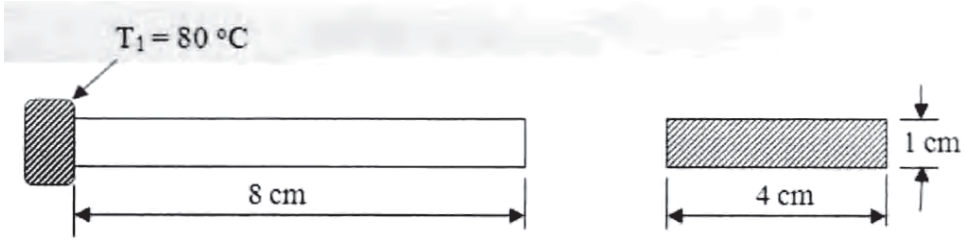


Figure 5

UNIT - V

Q9) a) Derive consistent mass matrix for one-dimensional bar element and CST element. **[10]**

b) Explain the difference between lumped mass matrix and consistent mass matrix. **[6]**

OR

Q10)a) Derive consistent mass matrix for truss element. **[8]**

b) Find the un-damped natural frequencies of longitudinal vibration of the stepped bar as shown in Figure 6 using consistent mass matrices. Given: Elastic Modulus E = 200 GPa, Area A_1 = 400 mm^2, A_2 = 200 mm^2, Density ρ = 8000 kg/m^3. **[8]**

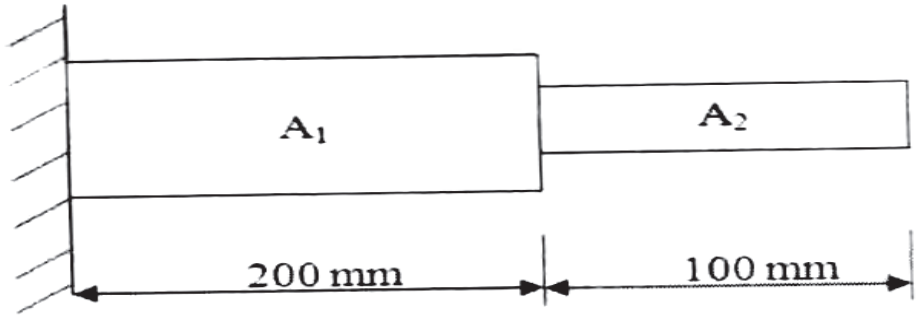


Figure 6

UNIT - VI

Q11)a) Explain various types of analysis in Finite Element Method. **[8]**

b) What are the advantages and limitations of free and mapped meshing in Finite Element Method? Which is most suitable for meshing complex geometries? **[8]**

OR

Q12)a) Define following quality check parameters. Explain their significance in Finite Element Method. Aspect ratio, warp angle, skew, jacobian, distortion, stretch, included angle, taper. **[10]**

b) What are the factors that affect computational cost in solving engineering problems using FEM? **[6]**

DATA SHEET

Shape Functions:

1 Bar Element

Cartesian coordinates

$$N_1 = 1 - \frac{x}{L}; \quad N_2 = \frac{x}{L} \quad ;$$

Natural coordinates

$$N_1 = \frac{1-\xi}{2}; \quad N_2 = \frac{1+\xi}{2}$$

2 Beam Element

In Cartesian coordinate

$$N_1 = \frac{1}{L^3}(2x^3 - 3x^2L + L^3) ;$$

$$N_2 = \frac{1}{L^3}(x^3L - 2x^2L^2 + xL^3) ;$$

$$N_3 = \frac{1}{L^3}(-2x^3 + 3x^2L) ;$$

$$N_4 = \frac{1}{L^3}(x^3L - x^2L^2) ;$$

In Natural coordinate

$$N_1 = \frac{1}{4}(2 - 3\xi + \xi^3) ;$$

$$N_2 = \frac{1}{4}(1 - \xi - \xi^2 + \xi^3) ;$$

$$N_3 = \frac{1}{4}(2 + 3\xi - \xi^3) ;$$

$$N_4 = \frac{1}{4}(-1 - \xi + \xi^2 + \xi^3) ;$$

Element Stiffness Matrices:

1. Bar Element

$$k_{bar} = \frac{AE}{L}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

2. Beam Element

$$k_{beam} = \frac{EI}{L^3}\begin{bmatrix} 12 & 6L & -12 & 6L \\ 6L & 4L^2 & -6L & 2L^2 \\ -12 & -6L & 12 & -6L \\ 6L & 2L^2 & -6L & 4L^2 \end{bmatrix}$$

3 Truss Element

$$k_{truss} = \frac{AE}{L}\begin{bmatrix} C^2 & CS & -C^2 & -CS \\ CS & S^2 & -CS & -S^2 \\ -C^2 & -CS & C^2 & CS \\ -CS & -S^2 & CS & S^2 \end{bmatrix} ;$$

$$C = Cos(\theta) \ \ and \ S = Sin(\theta), \theta \ is \ positive \ in \ anti - clockwise \ direction$$

Element Mass Matrices:

1. Bar Element

(a) Consistent mass matrix:

$$m_{consistent} = \frac{\rho AL}{6}\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix};$$

(b) Lumped mass matrix:

$$m_{lumped} = \frac{\rho AL}{2}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

2. Beam Element

(a) Consistent mass matrix:

$$m_{consistent} = \frac{\rho AL}{420}\begin{bmatrix} 156 & 22L & 54 & -13L \\ 22L & 4L^2 & 13L & -3L^2 \\ 54 & 13L & 156 & -22L \\ -13L & -3L^2 & -22L & 4L^2 \end{bmatrix};$$

(b) Lumped mass matrix:

$$m_{lumped} = \frac{\rho AL}{2}\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Heat Transfer Matrices:

K matrix for conduction +convection problem for bar element

$$K = \frac{kA}{L}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} + \frac{hPL}{6}\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix};$$ when end of fin is insulated

$$K = \frac{kA}{L}\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} + \frac{hPL}{6}\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} + hA\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix};$$ when end of fin is not insulated

Where A = cross-sectional area, k = Thermal conductivity, L = length of element,

h = convection coefficient, and P = perimeter

Gauss Quadrature:

Table for Gauss points for integration from -1 to +1

Number of Gauss Points	Location ξ_i	Associated weights
1	$\xi_1 = 0.0$	2.0
2	$\xi_1, \xi_2 = \pm 0.57735$	1.0
3	$\xi_1, \xi_3 = \pm 0.77459$ $\xi_2 = 0.0$	$5/9 = 0.55556$ $8/9 = 0.88889$
4	$\xi_1, \xi_4 = \pm 0.86113$ $\xi_2, \xi_3 = \pm 0.33998$	0.34785 0.65214

Total No. of Questions : 12]

SEAT No. :

P2857

[Total No. of Pages : 3

[5354]-45
B.E. (Mechanical)
ROBOTICS
(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State three laws of Robotics & discuss the significance of any one of them. **[6]**

b) Discuss various advantages of robotsation. **[6]**

c) Sketch & explain the working of Cartesian gantry type robot. State it's applications. **[6]**

OR

Q2) a) Explain the terms : **[6]**

i) Repeatability

ii) Compliance

iii) Spatial resolution

b) Sketch and explain the motions a 3 DOF wrist can perform. **[6]**

c) Sketch and explain types of joints in robot. **[6]**

Q3) a) Explain mechanical grippers. What are the ways of constraining the grippers? **[8]**

b) State different types of proximity sensors with principal of operation of each sensor. **[8]**

OR

P.T.O.

Q4) a) Define end effectors. Explain the two major categories of end effector in brief. **[6]**

b) A rectangular block weighing 20 kg is gripped in the middle and lifted vertically at a velocity of 1.5 m/s. If it accelerates to this velocity at 25 m/s^2 and the coefficient of friction between the gripping pads and the block is 0.40, calculate the gripping force required to prevent slippage. **[6]**

c) Describe the various kinds of sensors used in robotics. **[4]**

Q5) a) Explain various characteristics of actuators. **[4]**

b) It is desired to have a joint of six axis robot go from initial angle of 20° to a final angle of 80° in 5 sec. using cubic polynomial function calculate the joint angles, velocity and acceleration at interval of 1 sec, If joint will have position of 53° and joint velocity 20°/sec at t =3sec. **[12]**

OR

Q6) a) What are the different types of actuators? Explain any two briefly. **[6]**

b) Explain the control law of partitioning. **[6]**

c) State the comparison of robot drive systems. **[4]**

SECTION - II

Q7) a) A planar 3R manipulator has link lengths $I_1 = 100$ mm, $I_2 = 80$ mm and $I_3 = 60$ mm, Determine its reachable workspace and state whether point (200, 100) is reached with $\theta_1 = 40°$. If yes , what are the values of θ_2 and θ_3? If no, what should be the minimum value of θ_1 so that the point will be reached by the manipulator? **[8]**

b) Explain Newton's - Euler's dynamic formulation. **[8]**

OR

Q8) a) Explain the following terms (Any 2) **[6]**

i) Fixed Angle Representation

ii) Euler Angle Representation

iii) Forward Kinematics

b) Derive the dynamic model of a 2 DOF Planer RR Manipulator. **[10]**

Q9) a) Explain the image processing techniques. **[6]**

b) Explain typical vision system for a robot. **[6]**

c) Explain basic modes of robot language operating system. **[6]**

OR

Q10)a) Explain the following (Any 2) : **[6]**

i) Image acquisition

ii) Sampling

iii) Edge detection

b) Explain the various methods to enter programming command in to the controller memory. **[8]**

c) Discuss various motion interpolation schemes. **[4]**

Q11)a) Describe various search techniques used with respect to Artificial Intelligence in robots. **[8]**

b) Discuss tool and techniques of the simulation. **[8]**

OR

Q12)a) Explain maintenance and safety aspects of robots. **[6]**

b) Explain the followings : **[10]**

i) Genetic algorithm

ii) Artificial neural network

Total No. of Questions : 12]

SEAT No. :

P2858

[Total No. of Pages : 4

[5354]-46

B.E. (Mechanical) (Semester - II)

ADVANCED AIR CONDITIONING & REFRIGERATION

(2008 Course) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessar.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain pumped circulation system with neat schematic. **[8]**

b) A refrigeration system using R-134 as refrigerant has three evaporators of capacity 20 TR at -10°C, 30 TR at 5°C and 10 TR at 10°C. The vapour leaving three evaporators are dry and saturated. The system is provided with individual expansion compressors and multiple expansion valves. The condenser temperature is 40°C. The liquid refrigerant leaving the condenser is subcooled to 30°C. Assuming isentropic compression in each compressor, find: 1. The mass of refrigerant flowing through each evaporator; 2. The power required to drive the compressor; and 3. The C.O.P. of the system. **[10]**

OR

Q2) a) Explain any four methods of defrosting in brief. **[12]**

b) Explain secondary refrigerants used in refrigeration systems. **[6]**

Q3) a) Give the selection criteria of expansion devices. Explain working of electronic expansion valve. **[8]**

b) Explain operation of cooling tower with the help of psychometric chart. **[8]**

OR

P.T.O.

Q4) a) Explain the psychrometry involved in cooling tower design. Explain the types of cooling towers. **[8]**

b) Explain the dry expansion evaporator with the help of a neat sketch. What are advantages over flooded evaporator? **[8]**

Q5) a) How VFD helps to reduce energy consumption of refrigeration systems? Discuss various controls used for VFD. **[8]**

b) Construct the diagram for solenoid valve and describe its working principle. What do you mean by regulating valve? **[8]**

OR

Q6) a) Discuss the HP/LP cut out working. Explain compressor capacity controls for compressors. **[8]**

b) Explain controls for indoor air quality. **[8]**

SECTION - II

Q7) a) What is ECBC? Explain star rating concept applied to split air conditioner. **[8]**

b) Explain ETD method for cooling load calculation. **[10]**

OR

Q8) a) Explain flywheel effect as applied to cooling load calculation with neat labelled diagram. **[8]**

b) Explain New ASHRAE comfort chart and explain its significance. Show comfort zone on it. **[10]**

Q9) a) Specify the exact requirements for air conditioning systems for the followings: **[8]**

i) textile industry

ii) hospitals

iii) IT centers

iv) Pharmaceutical industry

b) Present the thermodynamic analysis of heat pumps. Explain various working fluids for heat pump systems. **[8]**

OR

Q10)a) Explain design considerations for multiplex air conditioning system. **[8]**

b) Discuss the performance testing procedure for heat pump systems. **[8]**

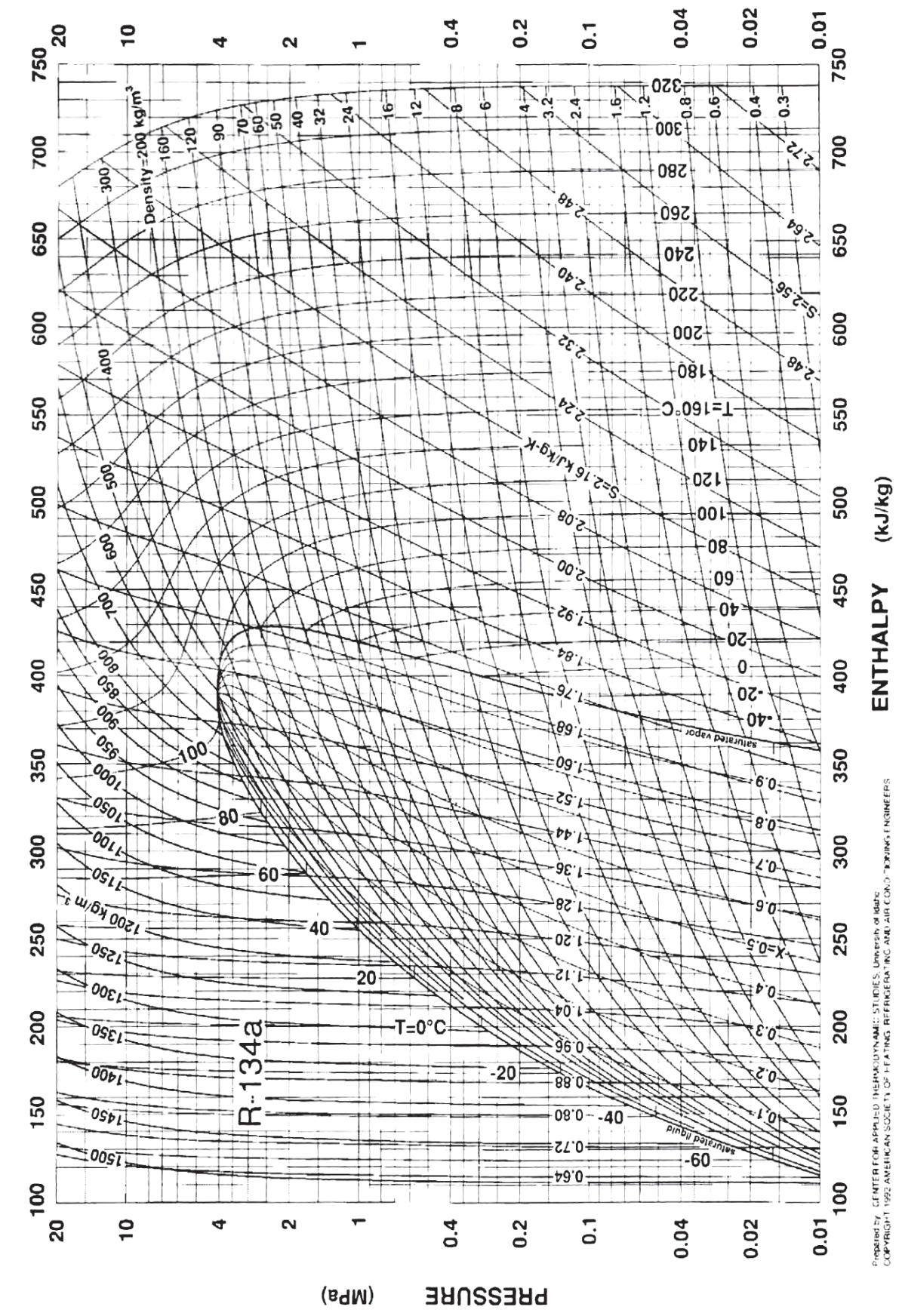
Q11)a) What are the insulating materials used in cooling systems? Explain in details. **[8]**

b) Define FOM. What are the limitations of production of ultra-low temperature? **[8]**

OR

Q12)a) Explain properties of cryogenic fluids. Discuss the insulating materials for ultra-low temperature. **[8]**

b) With neat diagram explain Linde-Hampson system. **[8]**


R-134a
PRESSURE (MPa)
ENTHALPY (kJ/kg)
Density=200 kg/m³
T=160°C
T=0°C
S=2.16 kJ/kg-K
X=0.5
saturated vapor
saturated liquid
Prepared by: CENTER FOR APPLIED THERMODYNAMIC STUDIES, University of Idaho
COPYRIGHT 1992 AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS

Total No. of Questions : 12]

SEAT No. :

P2859

[Total No. of Pages : 4

[5354]-47

B.E. (Mechanical)

INDUSTRIAL HEAT TRANSFER EQUIPMENTS

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, wherever necessary and mention the same clearly.***
5) ***Use of steam tables, Mollier chart and calculator is allowed.***

SECTION - I

Q1) a) Explain in brief classification of Heat Exchangers based on **[8]**

i) Construction

ii) Flow arrangements

iii) Heat Transfer process

iv) Surface compactness

b) Explain step by step procedure for double pipe heat exchanger design. **[8]**

OR

Q2) a) A counter-flow double-pipe heat exchanger is to heat water from 20°C to 80°C at a rate of 1.2 kg/s. The heating is to be accomplished by geothermal water available at 160°C at a mass flow rate of 2 kg/s. The inner tube is thin-walled and has a diameter of 1.5 cm. If the overall heat transfer coefficient of the heat exchanger is 640 W/m^2 °C, determine the length of the heat exchanger required to achieve the desired heating. **[8]**

b) Write note on : **[8]**

i) Hydraulic diameter and Equivalent diameter

ii) Hairpin heat exchanger

P.T.O.

Q3) a) What are different J factors? Explain their significance in Bell Delaware method. **[8]**

b) Explain TEMA and ASME standards of heat exchangers design. **[8]**

OR

Q4) a) In a shell-and-tube feed water heater, cold water at 15 °C flowing at the rate of 180 kg/h is preheated to 90 °C by flue gases from 150 °C flowing at the rate of 900 kg/h. The water flows inside the copper tubes (di=25 mm, do = 32 mm) having thermal conductivity kw = 381W/m-K. The heat transfer coefficients on gas and water sides are 120 and 1200 W/m^2 K, respectively. The fouling factor on the water side is 0.002m^2 /K-W. Determine the flue gas outlet temperature, the overall heat transfer coefficient based on the outside tube diameter, and the true mean temperature difference for heat transfer. Consider specific heats cp for flue gases and water as 1.05 and 4.19 kJ/kg- K respectively, and the total tube outside surface area as 5m^2. There are no fins inside or outside the tubes, and there is no fouling on the gas side. **[8]**

b) Write notes on following : **[8]**

i) Need of baffles and its various geometries

ii) Leakage and bypass stream on shell side of STHE

Q5) a) Classify and explain different types of Plate Fin Heat Exchangers. **[8]**

b) Explain in brief : **[10]**

i) Characteristics of compact heat exchanger

ii) Different forms of initially fined tubes

OR

Q6) Write short notes on : **[18]**

a) Advantages and limitations of compact heat exchangers

b) Automotive radiators

c) Plate heat exchangers

SECTION - II

Q7) a) Explain with neat sketch evaporative condensers. **[6]**

b) What do you mean by direct contact condenser. **[6]**

c) What are the sources of air leakages in the condenser? **[6]**

OR

Q8) a) Explain with neat sketch Air cooled and Water cooled condensers. **[10]**

b) What do you mean impingement plate in condenser? Why it is required? Explain with neat sketch? **[8]**

Q9) a) With simple sketch explain all components of cooling tower. **[8]**

b) How selection of - pumps, fans in cooling tower is done? **[8]**

OR

Q10)a) What is a need of cooling tower in thermal power plant? Classify cooling towers in brief. **[8]**

b) Write note on: Heat Transfer in cooling tower. **[8]**

Q11)Write Brief Note on Heat Pipe based on following points. **[16]**

a) Construction

b) Working principle

c) Different working fluid used

d) Applications

OR

Q12) Write note on following : **[16]**

a) Liquid cooling (Direct and Indirect)

b) Transpiration cooling

c) Forced and Natural cooling

d) Cooling of electric transformer and motor

Total No. of Questions : 12]

SEAT No. :

P2860

[Total No. of Pages : 3

[5354]-48

B.E. (Mechanical)

MANAGEMENT INFORMATION SYSTEM

(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

UNIT - I

Q1) a) Information as a strategic resource - Justify the statement. **[8]**

b) "MIS creates an impact on organizational function, performance and productivity." Justify with examples. **[8]**

OR

Q2) a) Define Management. Give management functions at various management levels. **[8]**

b) What are the various types of Organizational structures? Explain MIS - organization. **[8]**

UNIT - II

Q3) a) What is decision? Explain Decision making process with Herbert Simon Model. Explain support role of MIS to Herbert Simon Model. **[8]**

b) Explain the major characteristics of business decision making. **[8]**

P.T.O.

OR

Q4) a) Discuss MIS and decision making. **[8]**

b) Explain SDLC and its spiral model approach. **[8]**

UNIT - III

Q5) a) Explain Architecture of Data warehouse in accordance with Data warehouse and MIS. **[10]**

b) Explain KBES with suitable example. **[8]**

OR

Q6) a) Explain the concept of Decision support system (DSS). List types of DSS. **[10]**

b) What are data flow diagrams? List the types and explain any one with suitable example. **[8]**

SECTION - II

UNIT - IV

Q7) a) Explain various modern software design techniques. **[10]**

b) Justify the statement "There is the need of standardization in software organization." **[8]**

OR

Q8) a) Write a short note on : **[9]**

i) Data design

ii) Process design

iii) Output design

b) Explain CMM in software engineering? Explain any three CMM maturity levels in detail. **[9]**

UNIT - V

Q9) a) List the testing approaches. Explain any one in detail. **[6]**

b) State techniques to improve software reliability. **[6]**

c) Explain with neat sketch - Bath tub curve for software reliability. **[4]**

OR

Q10)a) State the software review process with the help of block diagram. **[4]**

b) State types of software maintenance. Explain any one in detail. **[6]**

c) Write a short note on : **[6]**

i) Software errors

ii) Faults

iii) Availability

UNIT - VI

Q11)a) Explain the application of MIS in production management with block diagram and flow chart. **[8]**

b) Explain the case study on 360° Feedback system. **[8]**

OR

Q12)a) Explain the application of MIS in supply chain management with block diagram and flow chart. **[8]**

b) Explain the case study E-Enterprise management. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2861

[Total No. of Pages : 4

[5354]-49

B.E. (Mechanical) (Semester - II)

RELIABILITY ENGINEERING

(2008 Pattern) (Elective - IV(C))

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from section - II.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define the terms : **[6]**

i) Failure density

ii) MTBF

iii) Hazard rate

iv) Reliability

b) The following failure data is collected for a group of 650 components. Find the failure density, hazard rate & reliability & plot functions against time. **[10]**

Operating time (Hrs.)	1	2	3	4	5	6	7	8	9	10
No. of Failures	130	83	75	68	62	56	51	46	41	38

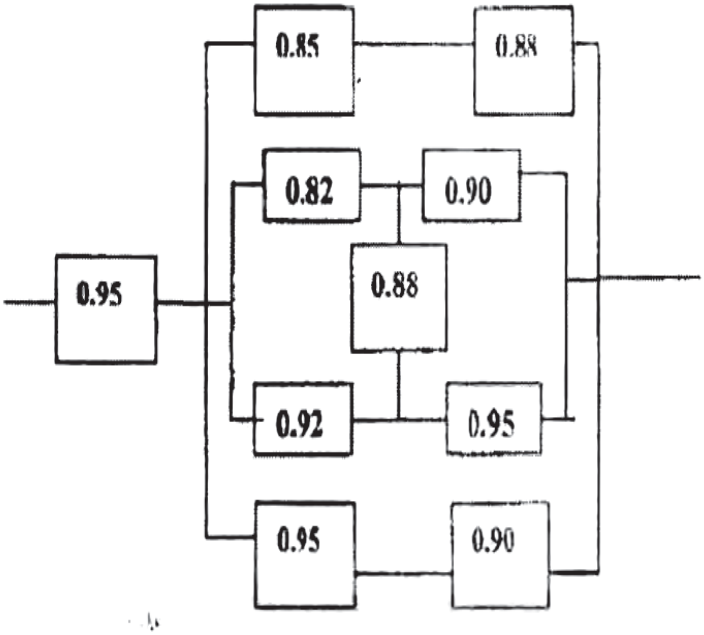
OR

Q2) a) Derive the relation between reliability and hazard rate considering the exponential distribution. **[8]**

b) Explain with neat sketch bath tub curve. **[8]**

P.T.O.

Q3) a) Find the reliability of the structure given below. **[10]**



b) Explain theorem of Total Probability. **[8]**

OR

Q4) a) In a parallel system if we need one out of four units to operate for successful working of the system, determine the expression for the reliability in terms of failure rate λ & mission time t. If λ is considered as 0.005 & mission time 100 hrs, find the reliability. **[6]**

b) Discuss briefly various probability distributions. Explain Weibull distribution. **[6]**

c) A total number of 50 components whose MTTF is known to be 200 hrs, are placed on a test continuously. Estimate the number of components which would fail in the time intervals 0 to 50 hrs, 50 to 100 hrs, 100 to 150 hrs. **[6]**

Q5) a) Write a note on AGREE Allocation method. **[8]**

b) A system consists of four subsystems A, B, C & D having failure rates 0.006, 0.0035, 0.004 & 0.002 respectively per hour. If the mission time is 100 hours & the system reliability required is 0.90, find the failure rate as well as reliability of each subsystem for the entire mission using ARINC method. **[8]**

OR

Q6) a) A system consists of four components connected in series with reliabilities 0.9, 0.8, 0.958, 0.95. It is desired that reliability of system should be 0.85. How this should be apportioned in three units using minimum effort method? **[8]**

b) Write a note on dynamic programming apportionment technique. **[8]**

SECTION - II

Q7) a) An air compressor has to be so designed that its minimum reliability is 0.9, for an operation time of 1000 hrs. The minimum availability value over the same period has to be 0.99. Estimate time to failure & mean time to repair. **[8]**

b) Write a note on reliability & maintainability trade off. **[8]**

OR

Q8) a) Discuss preventive & breakdown maintenance. **[8]**

b) For the particular system the following data are collected at a plant: **[8]**

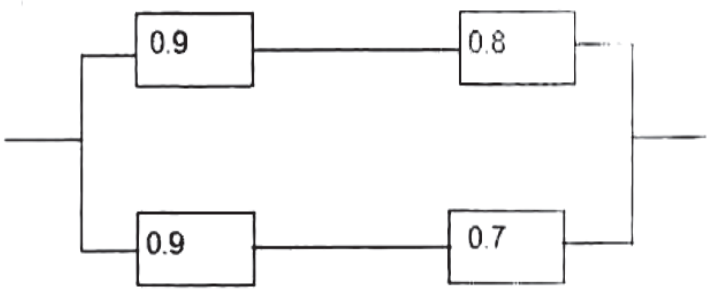
Mean time before failure: 65 hrs

Mean time to repair: 20 hrs

Administrative logistics time: 125% of MTTR

Calculate operational availability & inherent availability of the plant.

Q9) a) For the given block diagram construct Fault Tree Diagram & using that find out the reliability of the system. **[8]**



b) Write a note on FMECA. **[8]**

OR

Q10)a) A special purpose machine requires a continuous DC supply during operation. The required DC supply is made available through AC to DC converters. Two converters are used in order to receive uninterrupted DC supply. Converters receive power supply from substation which is directly connected to the main supply line. Construct a fault tree diagram for the system. Calculate failure rate of the system if the failure rate of each component assumed to be λ. **[8]**

b) Explain minimal tie set & minimal cut set method. **[8]**

Q11)a) Explain significance of "Safety Margin" in engineering reliability design. **[8]**

b) The mean strength & standard deviation of bolted joint are 3000 kgf/cm^2 & 300 kgf/cm^2 respectively. The joint is loaded such that stress induced has a mean value of 2500 kgf/cm^2 with standard deviation 50 kgf/cm^2. Assuming that shear strength & the induced stresses are independent & normally distributed, find out the probability of survival of bolted joint. Refer the statistical data given below. **[10]**

Z	1.2	1.3	1.4	1.5	1.6	1.7	1.8
ϕ(z)	0.8849	0.9032	0.9192	0.9331	0.9452	0.9550	0.9640

OR

Q12)a) Write a note HALT. **[8]**

b) The following data refers to a certain test of equipment **[10]**

Failure No.	1	2	3	4	5	6	7	8
Operating time for failure (hrs.)	18	12	08	22	26	35	30	40

Find out the reliability of the equipment by

i) Mean Method &

ii) Median Method & compare the two by plotting.

Total No. of Questions : 12]

SEAT No. :

P2862

[Total No. of Pages : 5

[5354]-53

B.E. (Computer) (Semester - II)

OPERATION RESEARCH

(2008 Pattern) (Elective - IV) (Open Elective) (Mechanical)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to these sections should be written in separate books.***
3) ***Use of non programmable calculator is allowed.***
4) ***Neat diagrams must be drawn whenever necessary.***
5) ***Figures to Right indicate full marks.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) A company manufactures two types of products - P_1 (lower quality) and P_2 (Standard Quality) profit on p_1 is 30/- and on P_2 is 40/- The raw material (in kg) required per unit of product P_1 and P_2 is 60 and 120 respectively. The machinery time (in Hrs) needed per unit of producing P_1 and P_2 are 8 and 5 respectively. The man-Hours for the assembly per unit of P_1 and P_2 are 3 and 4 respectively. The total availability of Raw material (in kg) machinery time (in Hrs) and assembly (in Hrs) are 12,000, 600, and 500 respectively.
Formulate above problem using Linear programming. Solve the same using simplex method For maximum over all profit. **[12]**

b) Define following terms w.r.t. LPP simplex method. **[6]**
i) Basic feasible solution
ii) Slack and surplus variables.

OR

Q2) a) Slove the following LPP using graphical method. **[10]**
Min $Z = 2x_1 + 8x_2$
Subject to $x_1 + x_2 \geq 200$
$x_1 \leq 80$
$x_2 \geq 60$ and $x_1, x_2 \geq 0$

P.T.O.

b) Explain how two-phase method helps to find out the feasibility of an Lpp. **[8]**

Q3) a) Define poisson's distribution method. What are the business applications to use the same. **[6]**

b) Explain following decision making criterion under uncertainty. **[10]**

i) Maximax or minimin decision

ii) Minimax or maximin decision

iii) Equally likely decisions

iv) Hurwitz criterion.

OR

Q4) a) Consider a problem of Military operations between countries A & B Both countries are having 3 kinds of Air crafts A_1, A_2 & A_3 as B_1, B_2 & B_3. Country A's goal is to hit it's enemy's aircraft where as B's goal is to avoid being hit. When Aircraft A_1 is used, aircrafts B_1, B_2, B_3 are hit with probabilities 0.9,0.4 and 0.2 respectively. With A_2 hitting probabilities are 0.3, 0.6 & 0.8. Further with A_3, hit Probabilities are 0.5, 0.7 and 0.2. Formulate problem in terms of game theory. Calculate lower and upper values of game. **[10]**

b) A Retailer purchases cherries every morning at Rs 50/- a case and sells them for Rs 80/- a case. Any case remains unsold at the end of the day Can be disposed of the next day at a salvage value of Rs 20/- percase. (Thereafter they have no values) Past sales have ranged from 15 to 18 cases per day. The following is the record of sales for past 120 days.

Cases sold :	15	16	17	18
Number of days :	12	24	48	36

Find out how many cases should retailer purchase per day in order to maximize his profit. **[6]**

Q5) a) Explain Birth & death process models with respect to quelleing system. **[8]**

b) A firm has several machines and wants to install it's own service facility for repair of machines. The average breakdown rate of machines is three per day. Assume that the interarrival time are independent exponential variables and the repair time has exponential distribution. The loss due to lost time caused by the breakdown of an inoperative machine is 40/- per day. The firm has two repair facilities - A and B. Facility A requires an installation cost 20,000/- facility B costs 40,000/-. The total labour cost is 5,000& 8,000 per year for A and B respectively. While A can repair 4.5 machines per day, B can repair 5 machines. Both facilities have a life of four years. Which facility should be installed? **[8]**

OR

Q6) a) Explain with suitable examples about Poisson arrival pattern and exponential service pattern. **[8]**

b) There is a congestion of the platform of a Railway station. The train arrive at rate of 30 Trains per day. The waiting time for any train is exponentially distributed with an average of 36 minutes. **[8]**

Calculate :

i) Mean Queue Size

ii) The probability that Queue size exceeds 9.

SECTION - II

Q7) a) Explain Johnson's Algorithm for determining an optimal sequence of processing 'n' items on two machines. Give justification of the Rule given in the algorithm. **[8]**

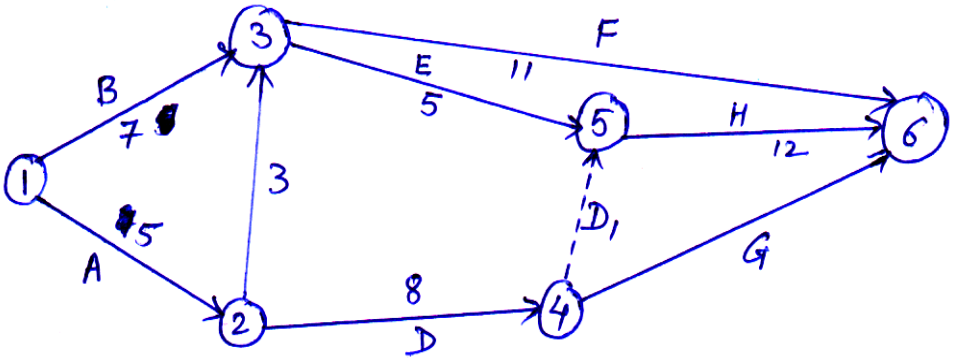
b) Solve the following sequencing problem, giving an optimal solution when passing is not allowed. **[10]**

Machine	Job				
	A	B	C	D	E
M_1	11	13	9	16	17
M_2	4	3	5	2	6
M_3	6	7	5	8	4
M_4	15	8	13	9	11

OR

Q8) a) What is PERT? Define optimistic time, pessimistic time and most likely time. How to estimate the expected time to complete the activity in the PERT technique? **[8]**

b) For following Network diagram find critical path. Assume that all the duration are in days. **[10]**



Q9) a) Explain the General Non-linear programming problem formulation. **[8]**

b) With the help of suitable diagram, explain linear approximation of a function using separable programming. **[8]**

OR

Q10)a) Explain - General form of Geometric programming. **[8]**

b) What is Quadratic programming? Explain any one method to solve the same. **[8]**

Q11)a) State Bellman's principle of optimality. Define following terms in dynamic programming. **[8]**

i) Stage

ii) State

iii) Optimal decision Rule

iv) Optimal policy

v) Multistage decision problem.

b) A Truck can carry a total 10 tons of a product. Three types products are available for transport. Determine the loading such that the total value of the cargo is maximum (at least one unit of each type must be loaded) weight and values of product are given below. **[8]**

Type	Value (Rs)	Weight (tons)
A	20	1
B	50	2
C	60	2

OR

Q12)a) What are similarities between dynamic programming and linear programming? How does dynamic programming conceptually differ from linear programming. **[8]**

b) Use dynamic programming to find value of **[8]**

Max $z = y_1 . y_2 . y_3$

Subject to constraint

$y_1 + y_2 + y_3 = 5$ and $y_1, y_2, y_3 \geq 0$

Total No. of Questions : 12]

SEAT No. :

P2863

[Total No. of Pages : 3

[5354]-55

B.E. (Mechanical - Sandwich)

INDUSTRIAL HYDRAULICS & PNEUMATICS

(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are the criterias for selection of oil for a hydraulic system. **[8]**

b) Compare hydraulic and pneumatic system. **[8]**

OR

Q2) a) What are quick connecting and disconnecting couplings used in hydraulic power system. **[8]**

b) Write a short notes on types of seals. **[8]**

Q3) a) Sketch & Explain balanced Vane pump. **[8]**

b) Classify hydraulic pump in details. **[8]**

OR

Q4) a) Write a short notes on pipings & fittings. **[8]**

b) Draw the characteristic curve of a positive displacement pump & explain. **[8]**

P.T.O.

Q5) a) Classify flow control valves in details. **[8]**

b) Explain with neat sketch working of spring loaded accumulator. **[10]**

OR

Q6) a) Explain the difference between direct and pilot operated pressure relief valve. **[10]**

b) Write a short on pressure control valves. **[8]**

SECTION - II

Q7) a) Explain with neat sketch "Sequencing circuit'. **[8]**

b) Explain with neat sketch "Motor Breaking Circuit". **[8]**

OR

Q8) a) Write a short note on "Types of Cylinder Mountings". **[8]**

b) Write a short note on "Hydraulic Motors". **[8]**

Q9) a) Write a short note on "Applications of pneumatics for Low Cost Automation". **[8]**

b) Explain with neat sketch "Pneumatic Clamp Circuit". **[8]**

OR

Q10)a) Write a short note on "Types of Fitters and Lubricators for Pneumatic systems". **[10]**

b) Write a short note on "Selection of Compressors." **[6]**

Q11)a) What are the factors considered for Designing of "Pneumatic Systems"? **[9]**

b) Write a short note on "Trouble Shooting & Maintenance procedures for "Pneumatic Systems". **[9]**

OR

Q12)a) What are the factors considered for designing of "Hydraulic Systems"? **[9]**

b) Write a short note on "Trouble Shooting" & Maintenance procedures for "Hydraulic Systems". **[9]**

Total No. of Questions : 12]

SEAT No. :

P2864

[Total No. of Pages : 5

[5354]-56

B.E. (Mechanical - Sandwich) (Part - I)

REFRIGERATION AND AIR CONDITIONING

(2008 Pattern) (Semester - I) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from Section I and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, Electronic pocket calculator, Steam tables and p — h chart is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Unit - I

Q1) a) Compare Vapour Compression Refrigeration with Air Refrigeration system. **[5]**

b) Write short note on Magnetic Refrigeration. **[5]**

c) Explain reverse Carnot cycle used for refrigeration with the help of p-V and T-s diagram. Also derive as expression for coefficient of performance. **[6]**

OR

Q2) a) What are the advantages and limitations of Air refrigeration systems? **[5]**

b) Write a note on Thermoelectric Refrigeration. **[5]**

c) The capacity of refrigerator is 200 TR when working between — 6°C and 25°C. Determine the mass of ice produced per day from water at 25°C. Also find the power required to drive the unit. Assume that the cycle operates on reverse Carnot cycle and latent heat of ice is 335 kJ/kg. **[6]**

P.T.O.

Unit - II

Q3) a) What are the essential properties of good refrigerants? How the refrigerants are classified? **[6]**

b) Explain the terms: **[6]**

i) ODP;

ii) GWP;

iii) TEWI.

c) Write a note on alternative refrigerants. **[6]**

OR

Q4) a) What is the difference between Primary and Secondary refrigerants? Why secondary refrigerants are used? List at least two secondary refrigerants. **[6]**

b) Provide the list of alternative refrigerants for CFC's and HCFC's with proper justification. **[6]**

c) What is the concept of green buildings. **[6]**

Unit - III

Q5) a) What is the need of multi staging? Explain in detail about Cascade system with the help of sketch and P – h diagram. **[8]**

b) A cascade system is designed to supply 10 tonnes of refrigeration at an evaporator temperature of –60°C and a condenser temperature of 25°C. The load at –60°C is absorbed by a unit using R22 as the refrigerant and is rejected to a cascade condenser at –20°C. The cascade condenser is cooled by a unit R12 as the refrigerant and operating between –30°C evaporating temperature and 25°C condenser temperature. The refrigerant leaving the R12 condenser is subcooled to 20°C, but there is no sub-cooling of R22 refrigerant. The gas leaving both the evaporators is dry and saturated and compressions are isentropic. Neglecting losses, determine: (1) Compression ratio for each unit, (2) Quantity of refrigerant circulated per minute for each unit, (3) COP of each unit, (4) COP of the whole unit and (5)Theoretieal power required to run the system. **[8]**

Properties for R12 and R22 are as follows:

Refrigerant	**R12**
At evaporator temperature (–30°C)	
Pressure at compressor inlet	p_5 = 1.044 bar
Enthalpy at compressor inlet	h_5 = 174.2 kJ/kg
Entropy at compressor inlet	s_5 = 0.7171 kJ/kg K
At condenser temperature (25°C)	
Pressure at compressor outlet	p_6 = 6.518 bar
Enthalpy at compressor outlet	h_6 = 207 kJ/kg
Enthalpy at condenser outlet	h_7 = 54.9 kJ/kg
Refrigerant	**R22**
At evaporator temperature (– 60°C)	
Pressure at compressor inlet	p_1 = 0.3745 bar
Enthalpy at compressor inlet	h_1 = 223.7 kJ/kg
Entropy at compressor inlet	s_1 = 1.054 kJ/kg K
At condenser temperature (– 20°C)	
Pressure at compressor outlet	p_2 = 2.458 bar
Enthalpy at compressor outlet	h_2 = 275 kJ/kg
Enthalpy at condenser outlet	h_3 = 22.2 kJ/kg

OR

Q6) a) Explain Electrolux system with a neat sketch. **[8]**

b) Define the function of the following components of Vapour Absorption Refrigeration System in detail : **[8]**

i) Absorber;

ii) Rectifier;

iii) Analyzer,

iv) Heat Exchangers.

SECTION - II

UNIT - IV

Q7) a) Explain the following with hand drawn psychometric chart. **[8]**

i) ADP;

ii) RSHF;

iii) GSHF;

iv) ERSHF

b) What is human comfort? Explain in brief the factors influencing the human comfort. **[4]**

c) Differentiate between ventilation and infiltration. **[4]**

OR

Q8) a) Write a short note on Automobile Air Conditioning System. **[4]**

b) Compare Unitary Air Conditioning and Central Air Conditioning. **[4]**

c) The readings from a sling psychrometer are as follows: **[8]**

DBT = 30°C; WBT = 20°C; Barometer reading =740 mm of Hg.

Using steam tables, determine:

i) DPT;

ii) Relative humidity;

iii) Specific humidity;

iv) Degree of saturation;

v) Vapour density;

vi) Enthalpy of mixture per kg of dry air.

UNIT - V

Q9) a) Enumerate the basic elements of the control system. Explain. **[8]**

b) Derive equation for the equivalent circular diameter of a rectangular duct. Take a and b are longer and shorter sides of a rectangular duct. **[10]**

OR

Q10)a) Write short notes on: **[10]**

i) Bimetal type thermostat for room temperature.

ii) Hair type humidistat for humidity control in air conditioning.

b) With neat sketch explain working of Thermostatic Expansion Valve. **[8]**

UNIT - VI

Q11)a) Describe the various methods of food preservation? **[6]**

b) Write short note on CA MA storages. **[4]**

c) Write in short about Transport and Marine refrigeration. **[6]**

OR

Q12)a) What is Cryogenics? What are the limitations of VCRS for production of low temperature. **[8]**

b) Explain Claude system for liquefaction of air with the help of block diagram and T- s diagram. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2865

[Total No. of Pages : 5

[5354]-58

B.E. (Mechanical - Sandwich)

FINITE ELEMENT METHOD

(2008 Pattern) (Semester - I) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section-I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section-II.*
2) *Answer to the two sections should be written in separate answer books.*
3) *Draw Neat diagrams wherever necessary.*
4) *Assume suitable data if necessary.*
5) *Figures to the right indicate full marks.*
6) *Use of calculator is allowed.*

SECTION - I

Unit - I

Q1) a) A system of spring as shown in fig 1a. One end of the assembly is fixed and a force of P = 2000 N is applied at other end. Using finite element method determine **[10]**

i) The Stiffness matrix of each element

ii) The Global stiffness matrix

iii) The Deflection of each spring

iv) The reaction force at support

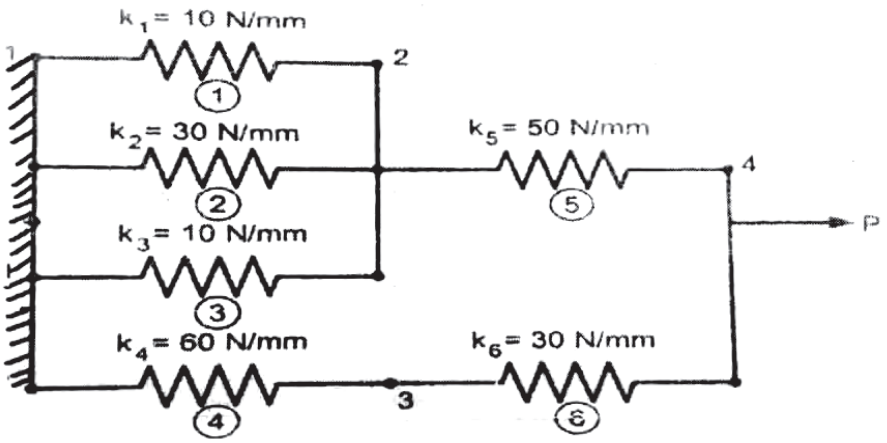


Fig. 1a

P.T.O.

b) Define the term FEM. Explain the applications of FEM in various field. **[6]**

OR

Q2) a) Write short note on (Any Two) : **[8]**

i) Principle of Virtual work

ii) Sources of errors in FEM

iii) Rayleigh-Ritz method

b) Explain the following methods of analysis. **[8]**

i) Finite Difference method

ii) Finite Volume method

Unit - II

Q3) a) Derive elemental stiffness matrix and force vector for two noded (linear) bar element using Principle of Minimum Potential Energy (PMPE) Method. **[8]**

b) Consider the bar as shown in fig 3b. Use P = 300kN, $A_1 = 0.5m^2$, $A_2 = 1m^2$, E = 200GPa. Determine **[10]**

i) Stiffness matrix of each element

ii) Global stiffness matrix

iii) Nodal Displacements

iv) Stresses in each element

v) Reaction forces

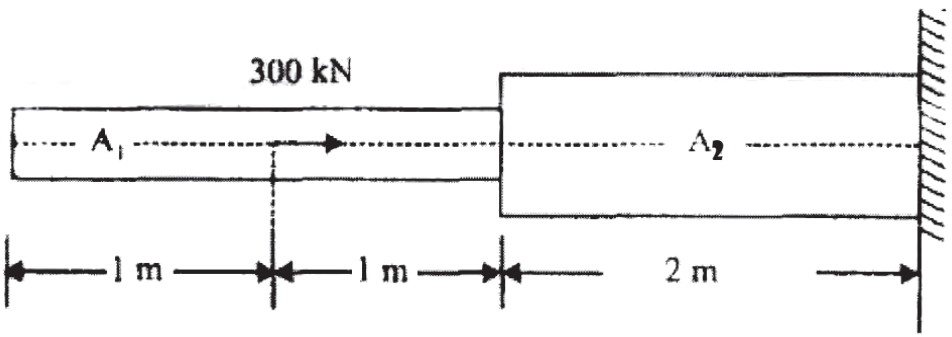


Fig. 3b

OR

Q4) a) For the plane truss as shown in fig. 4a, determine the following. Each element has $E = 20 \times 10^6$ N/cm^2. **[10]**

i) Write down the elemental stiffness matrices for each element

ii) Assemble k matrices to get global stiffness matrix K

iii) Find horizontal and vertical displacement of node 2

iv) Evaluate stresses in each element

v) Determine reaction forces at node 2 and 3

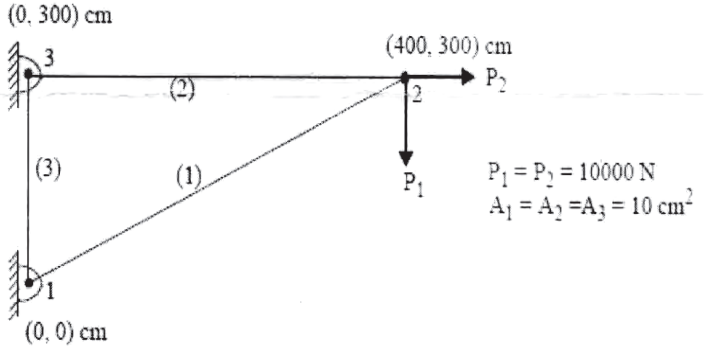


Fig. 4a

b) Explain the following terms (Any Two) **[8]**

i) Characteristics of Global stiffness matrix

ii) Penalty Approach

iii) Elimination Approach

Unit - III

Q5) a) Explain the terms linear and Quadratic CST element. **[6]**

b) In a CST element, the node 1, 2 and 3 have the Cartesian coordinates (0, 0), (10, 0) and (5, 8) respectively. The temperatures, in degree Celsius, at nodes 1, 2 and 3 are 100, 200 and 300 respectively. For a point p (5, 6) within the plate, determine: **[10]**

i) The natural coordinates

ii) Shape functions

iii) Temperature

OR

Q6) a) Explain with suitable example, plane stress and plane strain conditions. **[6]**

b) In a quadrilateral plate, the four vertices 1, 2, 3 and 4 have the Cartesian coordinates (2, 3), (6, 2), (5, 7) and (3, 6) respectively. The temperatures at the four corners 1, 2, 3 and 4 are 40°C, 20°C, 25°C and 30°C respectively. For a point p (5, 4) within the plate, determine: **[10]**

i) The natural coordinates

ii) Shape functions

iii) Temperature

SECTION - II

Unit - IV

Q7) a) Write short note on potential energy approach to derive beam element equations. **[8]**

b) Derive stiffness matrix for beam element. **[8]**

OR

Q8) For the beam and loading shown in fig. 8a. Determine **[16]**

a) The slopes at 2 and 3 and

b) The vertical deflection at the midpoint of the distributed load.

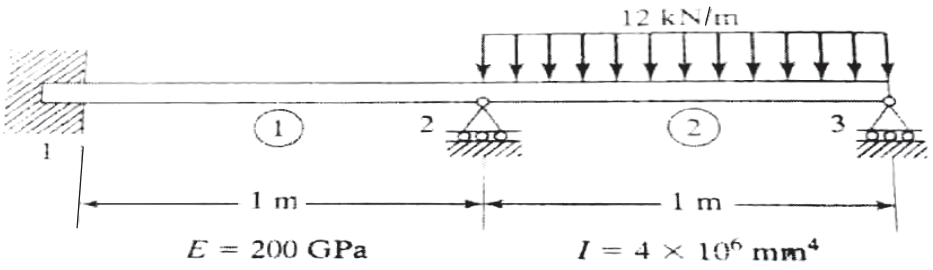


Fig. 8a

Unit - V

Q9) a) A metallic fin with thermal conductivity 70 W/m°C, 1cm radius and 5cm long extends from a plane wall whose temperature is 140 °C. Determine the temperature distribution along the fin if heat is transferred to ambient air at 20 °C, with heat transfer coefficient 5 W/m^{2}°C, take two element along the fin. **[10]**

b) Explain point sources in Heat transfer problems. **[6]**

OR

Q10)a) Write short note on one dimensional and two dimensional heat conduction analysis. **[8]**

b) Derive element stiffness matrix formulation for one dimensional steady state Heat conduction problems. **[8]**

Unit - VI

Q11)a) Explain the difference between dynamic and fatigue analysis. **[6]**

b) What is NVH analysis? State the advantages of NVH analysis. **[6]**

c) Explain crash analysis. What is the necessity of crash analysis? **[6]**

OR

Q12)Write short notes on (Any Three) : **[18]**

a) Modal Analysis

b) Types of Nonlinearities

c) Commercial FEA software

d) Quality checks in meshing

Total No. of Questions : 12]

SEAT No. :

P2866

[Total No. of Pages : 3

[5354]-59

B.E. (Mechanical Sandwich)

AUTOMOBILE ENGINEERING

(2008 Pattern) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Discuss vehicle layouts and list one example of each. **[8]**

b) What are the rolling & gradient resistances to motion of vehicle? **[8]**

OR

Q2) a) Discuss constructional details of Automotive chassis system. **[8]**

b) Explain with sketch the following layouts and also include advantages and disadvantages. **[8]**

i) Four wheel Drive.

ii) Front Engine and Front wheel Drive.

Q3) a) What is the purpose of clutch? Explain with sketch any one type of clutch used in automobile. Explain function of various components of it. **[8]**

b) Compare sliding mesh gear box with Constant mesh gear box. **[8]**

OR

P.T.O.

Q4) a) Explain with neat sketch **[8]**

i) Two speed rear axle.

ii) Differential drive.

b) Write note on following : **[8]**

i) Epicyclic Gearbox,

ii) Fluid Flywheel

Q5) a) Explain different types of springs working in suspension with their advantages and disadvantages. **[10]**

b) What are different components of an automobile Air Conditioners? **[8]**

OR

Q6) a) Explain steering gearbox in detail with sketch. **[8]**

b) Classify Brakes and Discuss operation of any two types of Brake. **[10]**

SECTION - II

Q7) a) Explain following systems in view of vehicle maintenance. **[8]**

i) Wheel Balancing

ii) Wheel Alignment

b) List out common steering troubles, their possible causes and remedies. **[8]**

OR

Q8) a) How vehicle tyres can be maintained, serviced and reconditioned. **[8]**

b) What are anti-corrosion additives & anti-freezing solutions? **[8]**

Q9) a) Justify active and passive safety in automotive safety. **[8]**

b) Enlist all kinds of lighting systems in vehicle with their necessity in vehicle. **[10]**

OR

Q10)a) What is Adaptive Front Lighting System (AFLS)? Explain its necessity and working. **[10]**

b) Write note on Vehicle Safety Systems. **[8]**

Q11)a) Explain various sensors and actuators in today's automobiles. **[8]**

b) Explain vehicle motion control system used in automobile. **[8]**

OR

Q12)a) Explain in detail fuel metering sensors. **[8]**

b) Write short note on the following (any two): **[8]**

i) Warning Devices

ii) Stepper motor-relays

iii) Digital Cruise Control

iv) Digital Engine Control System

Total No. of Questions : 12]

SEAT No. :

P2825

[Total No. of Pages : 3

[5354] - 6

B.E. (Civil)

AIR POLLUTION AND CONTROL

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from Section - I and any three questions from Section - II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Your answer will be valued as a whole.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Attempt the followings:

a) Discuss in details about the Parameters of Metrology. **[6]**

b) What are scales of Metrology? Give suitable example. **[5]**

c) Discuss with suitable sketches about Plume Behavior. **[6]**

OR

Q2) Answer the following :

a) Explain steps involved in ground level concentration measurement. **[9]**

b) Determine effective stack height from following data: **[8]**

i) Physical stack is 203 m tall

ii) Inside Diameter 1.07 m

iii) Wind velocity is 3.56 m/s

P.T.O.

iv) Air temperature is 13ºC.

v) Barometric pressure is 1000 millibars.

vi) Stack gas velocity is 9.14 m/s

vii) Stack gas temperature is 149ºC

Q3) Answer the following :

a) Discuss the Air pollution survey. Explain the process. **[9]**

b) How sampling of gases carried out? Explain in detail. **[8]**

OR

Q4) Answer the following :

a) What are the methods available in air sample analysis? Explain any one in details. **[9]**

b) Discuss Air Quality Monitoring. **[8]**

Q5) Answer the following :

a) How you can modify the indoor air quality? Explain in brief. **[8]**

b) What is air pollutant? Give its sources and effects. **[8]**

OR

Q6) Answer the following :

a) What are the sources of odor? How odor can be measured? **[8]**

b) Enlist the controlling methods for odor. Explain any one in detail. **[8]**

SECTION - II

Q7) Answer the following :

a) Give note on air pollution control by **[10]**

i) Process Modification.

ii) Change of Raw Material.

b) List out the types of control equipments. Explain settling chamber to remove minimum size of the particle. **[7]**

OR

Q8) Answer the following :

a) A fabric filter is to be constructed using bags that are 0.3 m in diameter and 6.0 m long. The bag house is to receive 10 m^3/sec of air, and the appropriate filtering velocity has been determined to be 2.0 m/min. Determine the number of bags required for a continuously cleaned operation. **[10]**

b) Discuss about Wet scrubber. **[7]**

Q9) Answer the following :

a) What is land use planning? Discuss. **[9]**

b) Give a note on economics of air pollution control. **[8]**

OR

Q10) Answer the following :

a) Discuss Air (Prevention and Control) Pollution Act 1981 with recent amendment. **[9]**

b) What are the emission standards in India for mobile and stationary sources? Discuss. **[8]**

Q11) Answer the following :

a) Who are the regulatory agencies and their role to obtain environmental clearance for project? **[8]**

b) How the public hearing and role of general public is important in environmental clearance? **[8]**

OR

Q12) Answer the following :

a) In what way water resource project impact on environment? Discuss. **[8]**

b) Explain in details Environmental management plan. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2867

[Total No. of Pages : 5

[5354]-60
B.E. (Mechanical-Sandwich)
OPERATIONS RESEARCH
(2008 Pattern) (Semester - I)(Elective - III) (Theory)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***All the questions are compulsory.***
2) ***Two separate answer books are used for Section I and Section II.***
3) ***Figures to the right side indicate full marks***
4) ***Use of calculator is permitted.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Define terms of Linear Programming: Basic Solution, Feasible Solution and Artificial Variables. **[6]**

b) A firm manufactures three products S_1, S_2 and S_3 on which the profits earned are Rs. 2, Rs. 5 and Rs. 4 respectively. Each product need two types of raw materials R_1 and R_2 which the firm can purchase up to a maximum of 500 and 400 units respectively. Design production plan so as to maximize the profit. **[12]**

Raw Material	Consumption of raw materials per unit product		
	S_1	S_2	S_3
R_1	0.5	1	1
R_2	2	0.5	0.5

OR

Q2) a) Distinguish between Slack, Surplus and Artificial variable. **[6]**

b) Solve LPP by Suitable Method **[12]**

Maximize : $Z = 2x_1 + 3x_2 + 10x_3$

Subject to $x_1 + 2x_3 = 0$

$x_2 + x_3 = 1$

$x_1, x_2, x_3 \geq 0$

Where $X_1, X_2, X_3 \geq 0$

P.T.O.

Q3) a) What is the unbalanced assignment problem ? How it is solved by Hungarian Method? **[6]**

b) Five jobs are to be assigned to 5 machines to minimize the total time required to process the jobs on machines. The time is in hours for processing each job on each machine is given in the following matrix. Make assignment of jobs to machines so that total assignment cost should be reduced. **[10]**

Machines

Jobs	A	B	C	D	E
1	2	4	3	5	4
2	7	4	6	8	4
3	2	9	8	10	4
4	8	6	12	7	4
5	2	8	5	8	8

OR

Q4) a) Explain with a suitable example 'Degeneracy in Transportation Problem'. **[6]**

b) Solve the following Transportation problem involving three sources and three destinations. The cell entries represent the cost of transportation per unit. Obtain the initial solution by VAM method and find optimal solution by MODI method. **[10]**

	I	II	III	IV	V	VI	Available
1	2	1	3	3	2	5	50
2	3	2	2	4	3	4	40
3	3	5	4	2	4	1	60
4	4	2	2	1	2	2	30
Required	30	50	20	40	30	10	180

Q5) a) Explain the break even chart. **[6]**

b) A company requires 16000 units of raw material costing Rs. 2 per unit. The cost of placing an order is Rs. 45 and carrying costs are 10 % per year per unit of average inventory. Determine : **[10]**

i) The economic order quantity.

ii) Cycle time.

iii) Total variable cost of managing the inventory.

OR

Q6) a) Explain payback period method. **[6]**

b) We have five jobs, each of which must go through A, B and C. Processing times (in hours) are given in the following table: **[10]**

Machines	JOBS						
	1	2	3	4	5	6	7
A	3	8	7	4	9	8	7
B	4	3	2	5	1	4	3
C	6	7	5	11	5	6	12

Determine the optimal sequence of jobs that minimizes the total elapsed time. Also find the idle time for machines A, B and C.

SECTION - II

Q7) a) What are the situations which make replacement of items necessary? **[6]**

b) A company has option of buying one of two computers: ABC and XYZ. ABC costs Rs. 5 lakh and its running and maintenance costs are Rs. 60,000 for each of first five years, increasing by Rs. 20,000 in sixth and every subsequent year. XYZ has the same capacity as that of ABC but costs only 2.5 lakh. However its maintenance and running costs are 1,20,000 for first five years and increases by Rs. 20,000 per year thereafter. If the money is worth 10 percent per year, which computer should be purchased? What are the optimal replacement periods for each computer? Assume that there is no salvage value for either of computers. **[12]**

OR

Q8) a) Explain the graphical method of solving 2 X n or m X 2 games. **[6]**

b) Machine A costs Rs. 45,000 and its operating costs are estimated to be Rs. 1000 for the first year and then increasing by Rs. 10,000 every subsequent year. Machine B costs Rs. 50,000 and operating costs are Rs. 2,000 for the first year and then increasing by Rs. 4,000 every subsequent year. If at present we have a machine A, should we replace it with machine B? if so when? Assume both the machines have no resale value and their future costs are not discounted. **[12]**

Q9) a) What is the need of simulation? How can you use simulation to solve industrial problems? Discuss with example. **[6]**

b) A road transport company has one reservation clerk on duty at a time. He handles the information of bus schedules and makes reservations. Customers arrive at the rate of 8 per hour and the clerk can arrange, service 12 customers per hour. After stating your assumptions answer the following

i) What is the average number of customers waiting for the service?

ii) What is the average time a customer has to wait before being served? The manager is contemplating to install a computer system for handling information and reservations. This is expected to reduce the service time from 5 minutes to 3 minutes. The additional cost of having new system is Rs. 50 /day. If the cost of goodwill of having to wait is estimated to be 12 paisa per minute spent waiting, before being served, should company install the computer system. Assume an 8 hour working day. **[10]**

OR

Q10)a) What is the need of simulation? How can you use simulation to solve industrial problems? Discuss with example. **[6]**

b) A warehouse has only one loading dock manned by three person crew. Trucks arrive at the loading doc at average rate of 4 trucks per hour and tge arrival rate is Poisson distributed. The loading of the trucks takes 10 minute in average and can be assumed to be exponentially distributed. The operating cost of the truck is Rs. 20 per hour and the members of the loading crew are paid Rs 6 each per hour. What you advise the truck owner to add another crew of three persons? **[10]**

Q11)a) Explain the rules devised by Fulkerson. **[4]**

b) Estimated time for the jobs of a project are given below. **[12]**

Job	A	B	C	D	E	F	G	H	I	J	K	L
Times (weeks)	13	5	8	10	9	7	7	12	8	9	4	17

The constraints governing the job are

A & B are start jobs; A controls C, D& E; B controls F & J; G depends on C; H depends on D; E & F controls I & K; K follows J; L is also controlled by K; G,H,I & L. are the last jobs. Draw the network, determine float for each activity, project duration and the critical path.

OR

Q12)An insurance company has decided to modernize and refit one of its branch offices. Some of the existing office elements will be disposed of but remaining will be returned to the branch after the completion of renovation work. Tenders are invited from a number of selected contractors. The contractors would be responsible for all the activities in connection with the renovation work expecting the prior removal of the old equipment and subsequent replacement. The major element of project work has been identified along with its durations and immediately preceding elements. **[16]**

Job	A	B	C	D	E	F	G	H	I	J	K	L	M
Time (Weeks)	14	4	2	1	2	3	2	4	3	12	4	2	2
Immediate Predecessors	--	A	B	C	A	E	E	E	H, L	K	D,F, G	J	H,L

a) Draw the network showing interrelationship between activities of project

b) Calculate minimum time required for project completion.

c) Locate the critical path.

Total No. of Questions : 12]

SEAT No. :

P2868

[Total No. of Pages : 3

[5354]-62
B.E. (Mechanical Sandwich)
COSTING AND COST CONTROL
(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three question from eah section.***
2) ***Answer to the two sections should be written in separate Answer - Books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Differentiate between financial accounting & cost accounting. **[8]**

b) Define cost & explain how the costs are classified. **[8]**

OR

Q2) a) State the explain limitations of financial accounting? **[8]**

b) Distinguish between product cost & period cost. **[8]**

Q3) a) Explain in detail elements of costs also distinguish between direct cost & Indirect cost. **[8]**

b) Explain the detail various parameter used for classification of costs? **[8]**

OR

Q4) a) What do you understand by direct expenses? What are the characteristics? **[4]**

b) Are direct expenses more important than indirect expenses? Explain. **[4]**

c) Define & explain in details of following with suitable examples. Manufacturing overheads Indirect Labour Cost. **[8]**

P.T.O.

Q5) a) Discuss the treatment of under absorbed and over absorbed factory overheads in Cost Accounting. **[10]**

b) Distinguish between Cost allocation & Cost absorption. **[8]**

OR

Q6) Calculate machine hour rate for recovery of overheads for a machine from the following information. **[18]**

Cost of machine is 25,00,000 & estimated solvage value is Rs. 1,00,000. Estimated working life of machine is 10 years. Annual working hours are 3000 in the factory. The machine is required 400 hrs per annum for repairs and maintenance. Setting up time of machine is 156 hrs per annum to be treated as productive time. Cost of repairs and maintenance for whole working life of the machine is Rs. 3,50,000 power used 15 units per hour at a cost Rs. 5 per unit. No power is consumed during maintenance and setting up time. A chemical required for operating the machine is Rs. 9,880 per annum. Wages of an operator is Rs. 4,000 per month. The operator, devoted one - third to his time to the machine, Annual insurance charges 2% of cost of machine.

Light charges for the department is 2,500 per month having 48 points in all out of which only 8 points are used at this machine. Other expenses are chargeable to the machine are Rs. 6,500 per month.

SECTION - II

Q7) What is by - product and how is it different from joint product? What are the various methods of accounting for by - product? Explain each method. **[18]**

OR

Q8) a) Discuss the distinguishing features of process cost system. **[8]**

b) What are the methods of apportioning joint cost? Explain any one in brief. **[10]**

Q9) a) Explain & illustrate Cash Break - even chart. **[6]**

b) A company has fixed cost of Rs. 90,000 Sales of Rs. 3,00,000 & profit of Rs. 60,000 **[10]**

Required :

i) Sales volume if in the next period, the company suffered a loss of Rs. 30,000

ii) What is the margin of safety for a profit of Rs. 90,000

OR

Q10)a) Explain - Margin of safety shows the financial strength of a business. **[8]**

b) Distinguish between Adsorption costing and Marginal Costing. **[8]**

Q11)a) State the basis of standard costing. **[8]**

b) State the need for standard cost. **[8]**

OR

Q12)Write a short note on :

a) Activity based costing. **[8]**

b) Techniques of marginal costing. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2869

[Total No. of Pages : 3

[5354]-64
B.E. (Mechanical Sandwich)
ENERGY MANAGEMENT AND INDUSTRIAL POLLUTION
(2008 Pattern) (Elective - IV)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the need of renewable energy sources and how do an industry, nation and globe would benefit from energy efficiency? **[9]**

b) Discuss energy security and energy strategy for the future of the nation. **[9]**

OR

Q2) a) Write short note on Energy Efficient Motors. **[9]**

b) Explain the concept of power factor improvement? **[9]**

Q3) a) Explain in detail methodology for conducting detailed energy audit. **[8]**

b) With suitable example, explain the need for fuel substitution. **[8]**

OR

Q4) a) What do you mean by Time value of Money? Discuss the various financial analysis techniques for investments in energy efficiency projects. **[8]**

b) A cogeneration system installation is expected to reduce an annual company's bill by Rs. 20 Lacks. If the capital cost of the new cogeneration installation is Rs. 60 Lacks. & Rs. 5 Lacks per year on an average required maintaining & operating plant. Calculate simple payback period & % return on Investment (%ROI). What is the future value of Rs. 1000/- after 3 years if the interestrate is 10%? **[8]**

P.T.O.

Q5) a) Explain the opportunities for improving energy efficiency in the boilers and furnaces. **[8]**

b) Write short note on Insulating materials and refractory materials. **[8]**

OR

Q6) a) How energy conservation is possible in pumping systems? **[8]**

b) Write the areas for improving the thermal efficiency of the HVAC systems. **[8]**

SECTION - II

Q7) a) Write a note on Man and Environment. **[9]**

b) Discuss the concept of Emission Trading and clean Development Mechanism. **[9]**

OR

Q8) a) Discuss various global environmental issues and ways to control it. **[10]**

b) Write short note on Fossil related pollutants. **[8]**

Q9) a) What are the sources of water pollution and air pollution with reference to industrial pollution? **[10]**

b) Explain in short, different air quality control techniques? **[6]**

OR

Q10)a) Write short notes on : **[10]**

i) Thermal Pollution

ii) Water pollution laws and standards

b) Write a short note on Clean Development Mechanism **[6]**

Q11)a) Write a note on waste minimization techniques. **[8]**

b) What are the benefits of waste heat recovery? **[8]**

OR

Q12)a) What do you understand by the sustainable development? **[8]**

b) Write short notes on : **[8]**

i) E waste

ii) Cogeneration

Total No. of Questions : 12]

SEAT No. :

P2826

[Total No. of Pages : 3

[5354] - 7

B.E. (Civil)

ARCHITECTURE AND TOWN PLANNING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.***
2) ***Assume suitable data, if necessary.***
3) ***Use separate answer sheets for Section - I and Section - II.***

SECTION - I

Q1) a) What kind of impact of elements is observed on architectural composition? **[9]**

b) How and why water body conservation & creation is responsible for benefitting the end users? Explain with a suitable example. **[8]**

OR

Q2) a) Explain in detail differences between the approaches and vision for the development of a city by a town planner and a project by an architect. **[9]**

b) Elaborate different garden styles, minimum 2 in detail. **[8]**

Q3) a) Elaborate the necessity of the concept "Built Environment"? Why this concept is to be promoted in megacities. **[9]**

b) Enlist the parameters on which Quality of Life is based and explain its relation with Urban Renewal process. **[8]**

OR

P.T.O.

Q4) a) Explain the importance of the prevailing byelaws for enriching the spaces and hence to arrive at a beautiful "Built Environment", within a town. **[8]**

b) What are the differences between URBAN DESIGN & URBAN RENEWAL? **[9]**

Q5) a) List various sustainable technologies and explain the advantages and usage of sustainable technologies. **[8]**

b) Enlist and elaborate approaches/aspects contributing for designating a building as a "Green Building"? **[8]**

OR

Q6) a) Write a short note on : Advantages and usage of sustainable materials. **[8]**

b) Write a short note on any one "Green build case study". **[8]**

SECTION - II

Q7) a) Explain various theories of developments ; draw suitable sketches. **[9]**

b) Explain the concept of new towns; by giving appropriate example. **[8]**

OR

Q8) a) Explain the contribution of town planners. **[9]**

b) Write short notes on : town planning scheme and mention appropriate examples. **[8]**

Q9) a) Elaborate the types of surveys and the importance of the same while finalizing DP Proposal. **[9]**

b) Explain in depth various urban road objectives and importance of traffic management. **[8]**

OR

Q10) a) Elaborate the common thread between levels of planning. **[9]**

b) Explain the junctions in urban road network and elaborate importance of traffic management. **[8]**

Q11) a) Write short notes on the following: **[8]**

i) MHADA.

ii) L A Act.

b) Elaborate applicability of modern tools for : **[8]**

i) Disaster management.

ii) Traffic regulation.

OR

Q12) a) Write a short note on : SEZ, giving its status in our country. **[8]**

b) Elaborate applicability of modern tools for : **[8]**

i) Land Use Analysis.

ii) Traffic management.

Total No. of Questions : 12]

SEAT No. :

P2870

[Total No. of Pages : 4

[5354]-71

B.E. (Automobile)

AUTOMOTIVE REFRIGERATION & AIR CONDITIONING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in Separate answer-books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of non-programmable calculator is allowed and psychrometric chart is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Vapor and gas as a refrigerant in reverse Carnot cycle. **[8]**

b) In a refrigeration plant working on Bell coleman cycle, air is drawn into the compressor at a pressure of 1 bar & at a temperature of –5°C. After the adiabatic compression to 5 bar, the air is cooled at a constant pressure to a temperature of 15°C. Then the air is expanded polytropicaly to a find pressure of 1 bar. The polytropic index of expansion is 1.2. Calculate:

[8]

i) refrigerating effect

ii) COP

OR

Q2) a) Explain with neat sketch practical vapour absorption cycle. **[8]**

P.T.O.

b) A refrigeration machine using R- 12 as refrigerant operates between the pressures 2.5 bar & 9 bar. The compression is an isentropic and there is no undercooling in the condenser. The vapor is in dry saturation condition at the beginning of the compression. Estimate the theoretical coefficient of performance. If the actual coefficient of performance is 0.65 of theoretical value. Calculate the net cooling produced per hour. The refrigerant flow is 5 kg per min. properties of refrigerant are: **[8]**

Pressure (bar)	Temp.°C	Enthalphy (kJ/kg)		Entropy of saturated
		Liquid	Vapor	Vapor, (kJ/kg K)
9	36	70.55	201.8	0.6836
2.5	–7	29.62	184.5	0.70001

Q3) a) Explain the types of refrigerants. **[9]**

b) Describe Accumulators, receiver driers used in refrigerating system. **[9]**

OR

Q4) a) Explain the refrigerant charge capacity determination with neat sketch. **[9]**

b) State and explain the different types of evaporator used in refrigeration system. **[9]**

Q5) a) Describe the different air distribution modes in car with neat sketch. **[8]**

b) Write short note on comfort condition in the car A/C system. **[8]**

OR

Q6) a) Explain the Vehicle operation modes & Cool-down performance. **[8]**

b) Write a short note on fan. Explain any two types in detailed. **[8]**

SECTION - II

Q7) a) Discuss the any two psychrometric processes with the help of hand drawn psychrometric chart. **[10]**

i) Humidification & Dehumidification

ii) Evaporative cooling

iii) Adiabatic chemical dehumidification

b) Air at 10°C DBT & 90% RH is to be heated & humidified to 35°C DBT & 22.5°C WBT. The air is preheated sensibly before passing to the air washer in which water is recirculated. The RH of air coming out of the air washer is 90%. This air is again reheated sensibly to obtain the final desired condition. Find : **[8]**

i) The temp. to which air should preheated

ii) The total heating required

iii) The make-up water required in the air washer

iv) The humidifying efficiency of the air washer

OR

Q8) a) Explain the following psychometric relation **[9]**

i) Humidity ratio

ii) Relative humidity

iii) Degree of saturation

iv) Daltons law of partial pressure

b) For a sample of air having 22°C DBT and relative humidity 30% at barometric pressure of 760mm of Hg, Calculate: **[9]**

i) Vapour pressure of air

ii) Humidity Ratio

iii) Vapour density or absolute humidity

iv) Enthalpy

Q9) a) Define following with neat sketch : **[8]**

i) OASH

ii) ERSHF

iii) GSHF

b) The following data refer to summer air conditioning of building : **[8]**

Outside design conditions = 43°C DBT,27°C WBT

Inside design condition = 25°CDBT,50% RH

Room Sensible heat gain = 84000 kJ/h

Room Latent heat gain = 21000 kJ/h

By pass factor of the cooling coil used = 0.2

The return air from the room is mixed with outside air before entry to cooling coil in the ratio of 4:1 by mass. Determine

i) Apparatus Dew Point of cooling coil

ii) Condition of the air entering & exit for cooling coil

iii) Fresh air mass flow rate

iv) Refrigerant load on cooling coil

OR

Q10)a) Explain the air conditioning electrical and electronic control with sketch. **[8]**

b) Explain the effect of air conditioning load on engine performance. **[8]**

Q11)a) Explain Any 2 from the following : **[8]**

i) Initial vehicle inspection

ii) Temperature measurement

iii) Odour removal

b) Write a short note on refrigerant recovery, recycle and charging. **[8]**

OR

Q12)a) Explain the system oil giving at least 2 examples of oil. **[8]**

b) Explain leak detection test. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2871

[Total No. of Pages : 4

[5354]-72

B.E. (Automobile) (Semester - I)

MACHINE & VEHICLE DYNAMICS

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Figures to the right side indicate full marks.***

2) ***Use of steam tables, slide rule, electronic calculator, psychometric chart is allowed.***

3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) A three cylinder Radial engine driven by common crank has the cylinders spaced at 120°. The stroke is 125mm, length of connecting rod 225mm and the mass of reciprocating parts per cylinder 2kg. Calculate the Primary and Secondary forces at crank shaft speed of 1200 rpm. **[10]**

b) Explain the effect of Partial balancing of reciprocating parts of two cylinder locomotive. **[6]**

OR

Q2) A four cylinder In-Line engine running at 2000 rpm is having crank and connecting rod length of 60mm and 240mm respectively. The mass of reciprocating parts of each cylinders are spaced 160mm apart and the cranks appears at 90° interval in an end view. If the firing order of the engine is 1-4-3-2 determine : **[16]**

a) The unbalances primary and secondary force.

b) The unbalances primary and secondary couple.

P.T.O.

Q3) a) The measurement on mechanical librating system show that it has a mass of 8kg on that spring can be combined to give an equivalent spring stiffness of 5.4 N/mm. If the vibrating system has a dash pot attached which has damping coefficient of 40 Ns/m. Determine. **[10]**

i) Critical damping coefficient

ii) Damping factor

iii) Logarithmic decrement

iv) Ratio of two Consecutive amplitude.

b) Define the terms : **[4]**

i) Degree of Freedom

ii) Phase angle

iii) Time Period

c) Explain Frequency Response Curve. **[4]**

OR

Q4) a) A spring mass dashpot system consist of spring of stiffness 400 N/m and the mass of 4kg. The mass is displaced 20mm beyond the equilibrium position and released. Find the equation of motion of the mass, if the damping coefficient of the dashpot is, **[12]**

i) 160 N-s/m

ii) 80 N-s/m

b) What are the types of damping? Explain any two in details. **[6]**

Q5) a) A vibratory body of mass 150kg supplied as spring of total stiffness 1050 kN/m has a rotating unbalance force of 525N at a speed of 3000 rpm if the damping factor is 0.3. Determine : **[12]**

i) The amplitude caused by unbalance

ii) Phase angle

iii) Transmissibility

iv) Actual Force transmitted

b) Discuss in brief magnification factor. **[4]**

OR

Q6) An electric motor is supported on a spring and dashpot. The spring has a stiffness 5000N/m and dashpot offers a resistance of 300N at 2.5m/s. The unbalanced mass of 1.5kg rotates at 50mm radius and total mass of electric motor is 50kg if the motor runs at 340 rpm determine: **[16]**

a) The damping factor

b) The phase angle

c) The amplitude of steady state vibrations

d) The resonance speed

e) The amplitude of resonance

f) The resultant force exerted by spring and dashpot on motor.

SECTION - II

Q7) a) Derive an expression for axle load of vehicle when it is stationary and standing on level ground. **[8]**

b) Write mathematical expression for tractive force available for motor vehicle in following case: **[8]**

i) Solid rear axle with non-locking differential

ii) Solid rear axle with locking differential

iii) Solid front drive axle with non- locking differential

iv) Independent front axle.

OR

Q8) a) Explain the concept of effective mass and mass factor used in evaluation of acceleration performance of vehicle. **[8]**

b) What are the co-ordinate system used in vehicle dynamics? **[8]**

Q9) a) List four vehicle ride vibration excitation Sources and elaborate any two in brief. **[6]**

b) Write note on Active and Semi active Suspension. **[6]**

c) Draw the typical quarter car model used for vehicle ride analysis. **[4]**

OR

Q10)a) List four vehicle ride vibration excitation Sources and elaborate any two in brief. **[6]**

b) What is role of isolation and absorber in ride mode? **[6]**

c) How tyre will made impact on handling? **[4]**

Q11)a) Derive an expression for steer angle of front wheel during high speed cornering. **[10]**

b) Explain Acceleration gain : **[8]**

i) lateral Acceleration gain

ii) yaw velocity

iii) critical speed

iv) characteristic speed

OR

Q12)Explain following terms: **[18]**

a) Low speed cornering

b) Tyre wear pattern

c) Constant radius steering

Total No. of Questions : 12]

SEAT No. :

P2872

[Total No. of Pages : 3

[5354]-73

B.E. (Automobile Engineering) (Semester - I)

AUTOMOTIVE SYSTEM DESIGN

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Explain the following :

a) Adequate and optimum design. **[6]**

b) Ergonomic considerations in design. **[6]**

c) Statistical considerations in design. **[6]**

OR

Q2) Write short note on:

a) Johnson's method of optimization. **[6]**

b) Design for natural tolerances. **[6]**

c) Aesthetic considerations in design. **[6]**

Q3) a) Derive an expression for torque transmitting capacity of a single plate clutch by assuming uniform pressure. **[8]**

P.T.O.

b) A friction clutch is required to transmit 33.12 kW at 2000 rpm. It is to be of single plate dise type with both sides effective, the pressure being applied axially by means of springs and limited to 68700 Pa. If the outer diameter of the plate is to be 0.305m, find the inner diameter of the clutch ring and the total force exerted by the springs. Assume the uniform wear and coefficient of friction 0.3. **[8]**

OR

Q4) a) State and explain friction materials used in clutches. **[4]**

b) What are the design requirements of a clutch? **[4]**

c) A single plate clutch consists of only one pair of contacting surfaces. It is used for an engine, that develops a maximum torque of 120 Nm. Assuming a factor of safety of 1.5 to account for slippage at full engine torque. The permissible intensity of pressure is 0.35 MPa and the coefficient of friction is 0.35. Assuming uniform wear, calculate the inner and outer diameters of the friction lining. **[8]**

Q5) a) Explain the gear boxes with different speed gears. **[6]**

b) A four speed gear box is to have the following gear ratios 1, 1.5, 2.48 and 3.93. The centre distance between the lay shaft and the mainshaft is 73.12 mm and the smallest pinion is to have atleast 12 teeth with a diametral pitch of 3.25mm. Find the number of teeth of the various wheels. Find the exact gear ratios. **[10]**

OR

Q6) a) Explain the parameters considered for selection of bearing. **[6]**

b) Design a 3 speed constant mesh gear box having a gear ratio of 3.6 in bottom and reverse gear. The mainshaft and lay shaft are 120 mm apart approximately. Take the module 3.25mm. The top gear has got unity gear ratio. Find the exact gear ratio. **[10]**

SECTION - II

Q7) a) State and explain the types of live axles. **[8]**

b) An Automobile engine develops 27.93 kW at 1500 rpm and its bottom gear ratio is 3.06. If a propeller shaft of 40 mm outside diameter is to be used, determine the inside diameter of mild steel tube to be used, assuming a safe shear stress of 56.25 MPa for the mild steel. **[8]**

OR

Q8) a) Explain the construction of any one type universal joint with neat sketch. **[8]**

b) A car has one of its rear wheels jacked up of the ground. With top gear engaged, the engine is turned by hand and it is found to make 11 turns while the jacked up wheel turns 4 times. With first gear engaged, 19 turns of the engine correspond to 2 turns of the road wheel. Assuming direct drive through the gear box in top drive, calculate the rear axle ratio and the first gear ratio of the gear box. **[8]**

Q9) a) Explain the theory of internal shoe brake with neat sketch. **[8]**

b) Explain the hydraulic braking system with neat sketch. **[8]**

OR

Q10)a) Calculate the mean lining pressure and heat generated during braking operation. **[8]**

b) The dise brake pads operate at a mean radius of 0.14m. The force applied to each pad is 4450N and the coefficient of friction between each pad and dise is 0.35. When the dise rotates at 500 rpm, calculate **[8]**

i) The frictional torque acting on the dise.

ii) The work done per minute by this torque.

iii) The heat energy generated per second.

Q11)a) Explain the heavy duty truck rear end suspension with neat sketch. **[8]**

b) A truck spring has 12 number of leaves two of which are full length leaves. The spring supports are 1.05m apart and the central band is 85mm wide. The central load is to be 5.4 kN with a permissible stress of 280 MPa. Determine the thickness and width of the steel spring leaves. The ratio of the total depth to the width of the spring is 3. Also determine the deflection of the spring. **[10]**

OR

Q12)a) Explain the components of steering system. **[12]**

b) State and explain any one steering gear mechanism. **[6]**

Total No. of Questions : 10]

SEAT No. :

P2873

[Total No. of Pages : 3

[5354]-74

B.E. (Automobile Engineering)

AUTOMOTIVE AERODYNAMICS & STYLING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Derive momentum equation of fluid flow. **[8]**

b) Explain lift & drag in brief. **[8]**

OR

Q2) Explain following terms in brief . **[4 × 4 = 16]**

a) Laminar flow

b) Incompressible flow

c) Stream function

d) Streak lines

Q3) a) Explain development of lift on aerofoil. **[8]**

b) Define 'Transonic area rule' in brief. **[8]**

OR

Q4) a) Explain lift & drag divergence in brief. **[8]**

b) Define 'Tip effect' in brief. **[8]**

P.T.O.

Q5) Explain any 3 in brief. **[3 × 6 = 18]**

a) External & internal flow pattern of vehicle

b) Cars as a bluff body

c) Aerodynamic developments in vehicle

d) Optimization of car body

e) Drag force

SECTION - II

Q6) a) Write a short note on 'aerodynamic forces & moments'. **[8]**

b) How CFD improves car aerodynamics? **[8]**

OR

Q7) Write a short note on following. **[4 × 4 = 16]**

a) Boat failing

b) Hatch back dust flow pattern

c) Effect of fastener

d) Wind noise

Q8) a) Explain 'full scale wind tunnel testing'. **[8]**

b) Write a short note on 'Flow visualization techniques.' **[8]**

OR

Q9) a) Explain 'climatic wind tunnel' in brief. **[8]**

b) Write a short note on 'wind noise measurement techniques'. **[8]**

Q10) Write a short note on any three of following. **[3 × 6 = 18]**

a) Asthetic preterence in styling

b) Vehicle color codes

c) Importance of 'Computer Aided Design' in aerodynamics & styling.

d) Front grill shape

e) Vehicle interior & styling

Total No. of Questions : 11]

SEAT No. :

P2874

[Total No. of Pages : 4

[5354]-75

B.E. (Automobile)

CAD CAM & AUTOMATION

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is the necessicity of homogeneous co-ordinate system? Write transformation matrices for translation & rotation. **[6]**

b) Triangle PQR has vertices as P(2, 4), Q(4, 6) & R(2, 6) is desired to reflect through an arbitary line whose equation is $Y = 0.5x + 2$. find the new vertices of triangle. **[10]**

OR

Q2) a) Discuss rotational & Translational mapping with suitable example. **[8]**

b) A triangle ABC A(32, 22), B(88, 20) & C(32, 82) is to be scaled by factor 0.6 about a point x (50, 42)

Find,

i) Composite transformation matrices

ii) Co-ordinates of scaled triangle.

[8]

Q3) a) Explain types of surfaces used in CAD/CAM systems with neat sketch. **[6]**

b) Given two lines L_1 & L_2 end points of L_1 are $P_1(2, 4, 6)$ & $P_2(5, 6, 2)$ & end points of line L_2 are $P_3(1, 5, -2)$ & $P_4(2, 8, 1)$

Determine :-

i) Parametric equation of lines.

ii) Unit vector in the direction of the lines.

iii) are the two lines parallel/perpendicular? **[10]**

P.T.O.

OR

Q4) a) Distinguish between solid modeling using CSG technique & B-rep technique. **[8]**

b) Compare B-spline & Bezier Curve. **[8]**

Q5) a) Write short note on "Plane stress and plane strain problem". **[6]**

b) A bar consist of two steps, an axial load of 200 KN is applied as shown in fig. 1.

Determine

i) Element Stiffness matrix

ii) Global Stiffness matrix

iii) Nodal displacement

iv) Stress in each element **[12]**

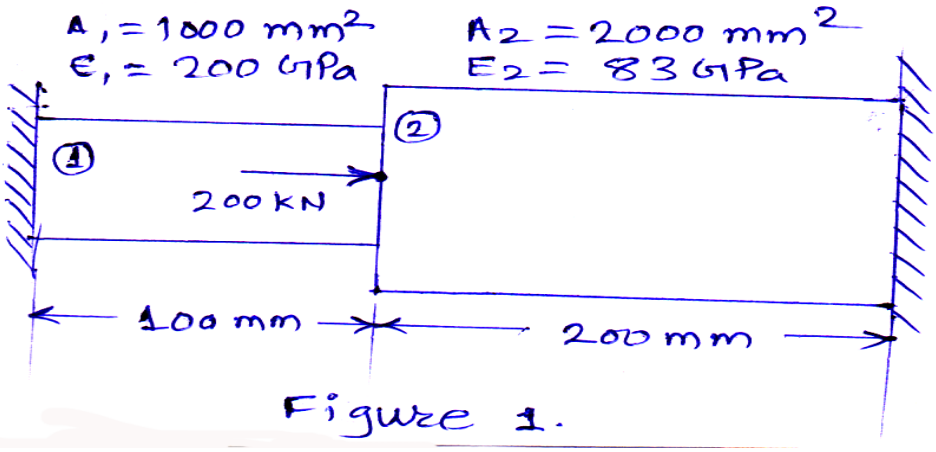


Figure 1.

OR

Q6) a) Explain the steps involved in FEM. **[6]**

b) Explain the principal of minimum potential energy used in deriving element stiffness matrix & equation. **[6]**

c) Determine the displacement of nodes of the spring system shown in figure 2. **[6]**

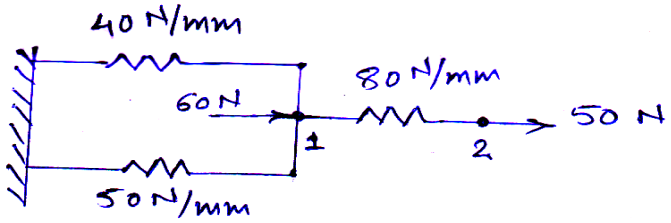


Figure 2.

SECTION - II

Q7) a) What are the advantages of CNC in contrast with NC machines? **[6]**

b) Write a part program for CNC lathe machin using FANUC controller for part showing in figure 3. Assume suitable data. Work size $\phi 30 \times 95$mm. **[10]**

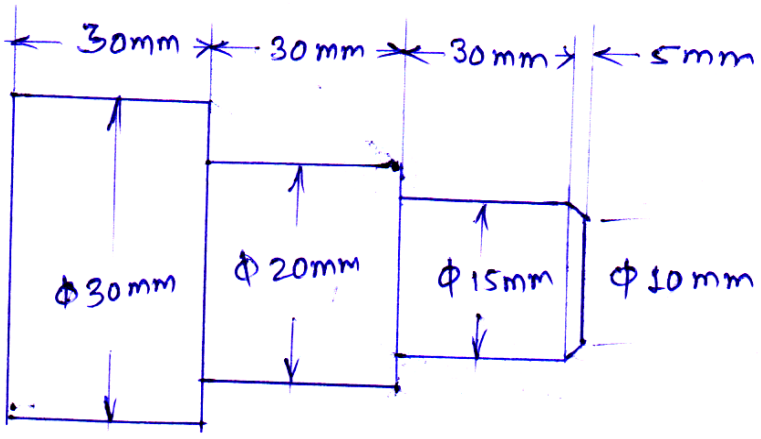


Figure 3.

OR

Q8) a) Explain Adaptive control system in detail. **[8]**

b) Enlist the types of machining centers used in CNC machines? Explain any one in detail with neat sketch. **[8]**

Q9) a) Compare the point to point & continous path robotic system. **[8]**

b) Enlist the different joints used in robots. Explain any three in detail. **[8]**

OR

Q10)a) Enlist the configurations of robotic systems. Explain any one in detail with neat sketch. **[8]**

b) Explain the Industrial applications of robots with suitable example. **[8]**

Q11) Write short note on. (Any three) **[18]**

a) Automatic storage and Retrival system

b) Geneva mechanism

c) Types of automation

d) Group Technology

e) FMS

Total No. of Questions : 12]

SEAT No. :

P2875

[Total No. of Pages : 3

[5354]-76

B.E. (Automobile Engineering)

AUTOMOTIVE NVH

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 ,Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Logarithmic tables, Sliderule, Electronic pocket calculator is allowed.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What is the role NVH in an Automotive design & Development. Explain it with example. **[10]**

b) Define the following : **[8]**

i) Periodic Motion & Time Period

ii) Frequency & Amplitude

iii) Fundamental mode of vibration

iv) Degree of Freedom

OR

Q2) a) Enlist the different types of vibrations. Explain any one in detail. **[10]**

b) Write a note on different sources of Vibration and Noise in an Vehicle. **[8]**

Q3) a) An unknown mass M is attached to one end of a spring of stiffness K having natural frequency of 6 Hz. When 1 kg mass is attached with M , the natural frequency of the system is lowered by 20%. Determine the value of unknown mass M and stiffness K. **[8]**

b) Discuss in detail Modal Analysis. **[8]**

P.T.O.

OR

Q4) a) Write a note on generalized coordinates. **[8]**

b) The spring of Automobile trailer is compressed 0.1 m under its own weight wave. Find the critical speed when the trailer is travelling over a road with a profile approximated by a sine wave of amplitude 0.08m and a wavelength of 14m. What will the amplitude of vibration at 60km/hr? **[8]**

Q5) a) Describe in detail untuned dry friction damper & draw its frequency response curve. **[8]**

b) How to control torsional oscillations amplitude in engine crank shaft? Describe its procedure in detail? **[8]**

OR

Q6) a) Write a note on Viscous Damper. **[8]**

b) How to obtain the engine vibration isolation from vehicle structure. **[8]**

SECTION - II

Q7) a) Describe the following : **[8]**

i) Structure Born Sound

ii) Air Born Sound

b) Explain the effect of reflecting surfaces on sound wave propagation. **[8]**

OR

Q8) a) Derive the relationship between sound power and sound intensity. **[8]**

b) Describe the Anatomy of human ear. **[8]**

Q9) a) Enlist the types of the Noise measuring instruments. Explain Microphone as Noise measurement device in detail. **[10]**

b) Discuss in brief Ambient Emission Noise standards in India. **[8]**

OR

Q10)a) The worker is exposed to noise according to the following schedule: **[10]**

Exposure Level DB	92	95	97	102
Period of Exposure	3	2	2	1

Does the daily noise dose is exceeded as per OSHA standards?

b) Explain in detail Interior Noise in a Vehicle. **[8]**

Q11)a) Explain in detail Vehicular Noise Measurement Techniques? **[8]**

b) What do you mean by Noise Control along the path? Discuss it in brief. **[8]**

OR

Q12)a) Write a note on Engine Noise Control. **[8]**

b) Discuss the following : **[8]**

i) Brake Noise

ii) Tyre Noise

Total No. of Questions : 11]

SEAT No. :

P2876

[Total No. of Pages : 3

[5354]-78

B.E. (Automobile Engineering)

VEHICLE SAFETY

(2008 Pattern) (Elective - II B)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section. Q1 is Compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Logarithmic tables, Sliderule, Electronic pocket calculator is allowed.***
5) ***Assume Suitable data if necessary.***

SECTION - I

Q1) a) What are the characteristics of vehicle structure? **[8]**

b) Explain the importance of ergonomics in automotive safety. **[8]**

Q2) a) Explain the procedure for the Frontal Impact Test. **[8]**

b) What are the standard requirements of a Vehicle Body Structure. **[8]**

OR

Q3) a) Write a note on Crumple Zone in a Vehicle. **[8]**

b) Explain in detail Roll Over Test. **[8]**

Q4) a) Write a note on Location of Controls with respect to vehicle safety. **[8]**

b) Enlist the different types of dummies used for vehicle testing. Explain any one of them in detail. **[10]**

P.T.O.

OR

Q5) a) How do you determine injury threshold? Explain the procedure for the same in detail. **[10]**

b) Write a note on : **[8]**

i) Servicity Index

ii) Study of Acceptable Tolerances

SECTION - II

Q6) a) Differentiate in-between Active and Passive Safety. **[8]**

b) Describe in detail Pedestrian Safety. **[8]**

OR

Q7) a) Enlist the different types of the safety glasses. Also give the standard requirements of these safety glasses. **[8]**

b) Explain in detail Head Restraints safety system with neat sketch. **[8]**

Q8) a) Enlist the types of the Automotive Lamps. Explain the parabolic headlight with neat sketch. **[10]**

b) Write a note on recent trends in Automotive Lighting. **[8]**

OR

Q9) a) Discuss the following with respect to Vehicle Safety : **[10]**

i) Direction Indicator

ii) Reverse Lamp

iii) Stop Lamp

b) Explain in detail the procedure for the testing of Automotive Lamps. **[8]**

Q10)a) What are the general specifications applicable to all the Vehicle Tests. **[8]**

b) What are AIS standards for Emergency Exit from an Automobile. **[8]**

OR

Q11)a) Write a note on following with respect to the AIS standards **[8]**

i) Driver Cabin Lighting

ii) Passenger Compartment Lighting

b) Write down the general requirements for Body Structure Strength Test. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2827

[Total No. of Pages : 3

[5354] - 8

B.E. (Civil) (Semester - I)

ADVANCED GEOTECHNICAL ENGINEERING

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from Section - I and three questions from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Your answers will be valued as a whole.***
5) ***Use of electronic pocket calculator is allowed & IS codes are not allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Explain : **[16]**

a) USCS.

b) ISCS.

c) HRB classification.

d) Diffuse Double Layer.

OR

Q2) a) Explain the use of 'A-line chart' by giving sample example. **[8]**

b) Explain different 'soil structures' & 'clay minerals'. **[8]**

Q3) a) Explain, K_a, K_p & K_o, giving field examples. **[7]**

b) Explain 'modified culmann's method. **[10]**

P.T.O.

OR

Q4) a) Explain the steps for design of gravity set wall using 'Ramkine's theory'. **[9]**

b) Explain 'Free Earth Support Method'. **[8]**

Q5) a) Discuss 'Geosynthetics'. **[6]**

b) Explain properties & functional requirement of Geogrid. **[6]**

c) Discuss 'Prinquet & Lee' theory. **[5]**

OR

Q6) a) Explain 'RE Wall'. **[6]**

b) Discuss 'Soil Nailing'. **[5]**

c) Discuss 'Geosynthetics in Geoenvironment'. **[6]**

SECTION - II

Q7) Explain : **[16]**

a) Vibrations.

b) Pressure bulb.

c) Barken's method.

d) Pauw's analysis.

OR

Q8) a) How will you determine C_u & amplitude, in Resonance condition? **[8]**

b) Discuss the design criteria for impact type machines as per IS - 2974 (pt - II) - 1966. **[8]**

Q9) Explain : **[18]**

a) Vibrofloatation.

b) Sand drains.

c) Multi-underseamed pile.

d) Bored compaction pile.

OR

Q10) a) Explain the steps for construction of Vibro-Expanded pile. **[9]**

b) Explain stepwise, design of sand drain by giving sample example. **[9]**

Q11) Explain the term 'Rheology' & discuss different 'Rheological models'. **[16]**

OR

Q12) Explain : **[16]**

a) Creep.

b) Secondary consolidation.

c) Kelvin Model.

d) Hookean & Newtonian models.

Total No. of Questions : 12]

SEAT No. :

P2877

[Total No. of Pages :3

[5354]-81

B.E. (Automobile) (Semester - II)

ALTERNATIVE FUELS AND EMISSION CONTROL

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***figures to the right side indicate full marks.***
5) ***Use of logarithmic tables, slide rule, electronic pocket calculator is allowed.***

SECTION - I

Q1) a) What do you mean by alternative fuels? Explain its need, advantages and application in an automobile. **[10]**

b) Write the calorific value & general chemical formula of following fuels.(any 3) **[6]**

i) petrol

ii) diesel

iii) LPG

iv) CNG

v) BIO GAS

OR

Q2) a) How are SI and CI engine fuels rated? **[6]**

b) What is enthalpy of formation and enthalpy of combustion? **[10]**

P.T.O.

Q3) a) Explain the properties of hydrogen fuel & give its advantages and disadvantages over conventional fuels. **[6]**

b) Write a note on biogas as a fuel for IC engine. **[6]**

c) Differentiate LPG & Petrol by its properties, advantages, disadvantages and applications. **[6]**

OR

Q4) Explain engine modifications required while using bio-diesel as fuel for IC engine? **[9]**

Write note on CNG as fuel for IC engines. **[9]**

Q5) a) Explain any two synthetic fuels with its properties, advantages, disadvantages & handling. **[8]**

b) Write note on air vehicle. **[8]**

OR

Q6) a) What are the different synthetic fuels used in vehicle? Explain its effect on engine performance. **[8]**

b) Can we use water as fuel for vehicle? Explain. **[8]**

SECTION - II

Q7) a) What is positive crankcase ventilation? Explain. **[8]**

b) How will you reduce the NOx emission in SI engine? **[8]**

OR

Q8) a) Explain effect of design and operating parameters on SI engine emission. **[16]**

Q9) a) Why turbocharger is used in automobile explain effects of turbocharging on emission? **[8]**

b) Describe the sources and causes of soot and particulate formation? **[8]**

OR

Q10) Explain effect of design and operating parameters on CI engine emission. **[16]**

Q11) Explain the remedies for engine emission. **[9]**

List the negative effects of CO emission on human health. what is treatment to CO intoxication person? **[9]**

OR

Q12) Write a note on.

a) Effect of NOx emission on human as well as on environment **[6]**

b) Indian emission norms **[6]**

c) Ambient air quality monitoring **[6]**

.

Total No. of Questions : 10]

SEAT No. :

P2878

[Total No. of Pages :3

[5354]-82

B.E. (Automobile Engineering)

VEHICLE PERFORMANCE & TESTING

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer to the two sections should be written in separate books.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain following performance parameter in brief. **[8]**

i) Deceleration

ii) Comfort

b) Write a short note on 'Catalytic Converters'. **[8]**

OR

Q2) a) Explain following performance parameter **[8]**

i) Handling

ii) Top speed

b) Write a short note on 'EGR Converter'. **[8]**

Q3) a) Write a short note on testing of clutch. **[8]**

b) Explain working of 'torque converter' in brief. **[8]**

P.T.O.

OR

Q4) a) Explain testing of gear box in brief. **[8]**

b) Write a short note on Epicyclic transmission. **[8]**

Q5) Explain any three from following in brief. **[3× 6=18]**

a) Wheel alignment and Balancing test.

b) Accelerated Testing

c) Evaporative emission testing

d) Steering pad & gradient track

e) Euro III

SECTION - II

Q6) a) Write a short note on 'GPS'. **[8]**

b) Explain 'Air bag system' in brief. **[8]**

OR

Q7) a) Explain short note on 'ergonomic consideration in safety'. **[8]**

b) Write a short note on 'Energy absorption system' in brief. **[8]**

Q8) a) Explain 'class - III hybrid dummies' in brief. **[8]**

b) Write a short note on 'vehicle to vehicle impact'. **[8]**

OR

Q9) a) Explain 'pole crash testing' in brief. **[8]**

b) Write a short note on 'Braking Distance test'. **[8]**

Q10) Write a short note on any three form following. **[3× 6=18]**

a) Endurance test

b) Battery test

c) Sources of Noise in Vehicle

d) Sources of shocks in vehicle

e) Sensor Mounting in vehicle

.

Total No. of Questions : 12]

SEAT No. :

P2879

[Total No. of Pages :4

[5354]-83

B.E. (Automobile)

HYDRAULICS AND PNEUMATICS

(2008 Pattern) (Semester - II) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Discuss the various applications of fluid power. **[8]**

b) Differentiate between Hydrostatic transmission and Hydrodynamic transmission. **[8]**

OR

Q2) a) Describe with neat sketch Quick Disconnect Couplings. **[8]**

b) What are the benefits achieved from conditioning of the hydraulic fluid? **[8]**

Q3) a) Describe with neat sketch unbalanced, variable displacement vane pump. **[8]**

b) A gear pump has 75 mm outside diameter, 50 mm inside diameter and a 25 mm width. Calculate the volumetric efficiency, if the pump has an actual flow of 100 lpm at 1800 rpm and rated pressures. **[8]**

OR

P.T.O.

Q4) a) Describe with neat sketch spring loaded accumulator. **[8]**

b) A pump has a displacement volume of 98.4 cm^3. It delivers 0.00152 m^3/s at 1000 rpm and 70 bar. If the prime mover input torque is 124.3 N-m, find.

i) Overall efficiency of the pump

ii) Theoretical torque required to operate the pump. **[8]**

Q5) a) Discuss the working of modular valves and cartridge valves with neat sketch. **[10]**

b) Describe with neat sketch meter-in-circuit used for speed control of cylinder. **[8]**

OR

Q6) a) Describe with neat sketch Direct operating Relief valve and pilot operated Relief valve. **[10]**

b) Discuss the working of Remote Pilot Operated Counterbalance Valve. **[8]**

SECTION - II

Q7) a) Classify Hydraulic Cylinders. Describe single acting cylinder. **[8]**

b) A hydraulic motor has 100 cm^3 volumetric displacement. If it has a pressure rating of 75 bar and it receives from a 50 lpm pump. Find the speed, torque capacity and power capacity of the motor. **[8]**

OR

Q8) a) Describe with neat sketch hydraulic motor braking system. **[8]**

b) How a single acting cylinder can be controlled? **[8]**

Q9) a) Compare Hydraulic and Pneumatic system. **[8]**

b) What are the types of Pneumatic actuators? Discuss any two. **[8]**

OR

Q10)a)Write a short note on . **[8]**

i) Mechanical Separators

ii) Filter Separators

b) Draw a neat sketch and explain working of a typical 3 way 2 position normally open direction control valve used in pneumatics. **[8]**

Q11) Two identical cylinders A an B are to be operated simultaneously. The cylinder moves against a load of 25 kN while the cylinder B has a load of 20kN. Both the cylinders have a stroke of 1m. The working stroke is to be completed in about 20 seconds time. The return stroke of cylinder B is to start only after the cylinder A is completely retracted. The return speeds are to be as fast as possible.

Draw a circuit which will fulfill these requirements. Select different components you used in the circuit from the data given. Mention the ratings of the components in case it is not available in the given data. **[18]**

OR

Q12) Draw a simple hydraulic circuit which will operate a hydraulic cylinder of a machine. The load during the forward stroke is 15 kN and that during the return stroke is approx. 9.5kN. The forward and return speeds are about 3.5 m/min and 5.5 m/min. respectively. Total stroke of the cylinder is 300 mm. Provision is required to hold the cylinder any where in between the end positions. Select different components from the data given. Specify ratings of the components in case it is not available. **[18]**

.

DATA

1. Suction Strainer :

Model	Flow Capacity (/pm)
S_1	38
S_2	76
S_3	152

2. Pressure Gauge :

Model	Range (bar)
PG_1	0 - 25
PG_2	0 - 40
PG_3	0 - 100
PG_4	**0 - 160**

3. Vane Pump :

Model	Delivery in / pm		
	at 0 bar	at 35 bar	at 70 bar
P_1	8.5	7.1	5.3
P_2	12.9	11.4	9.5
P_3	17.6	16.1	14.3
P_4	25.1	23.8	22.4
P_5	39.0	37.5	35.6

4. Relief Valve :

Model	Flow capacity (/ pm)	Max Working Pressure & bar
R_1	11.4	70
R_2	19	210
R_3	30.4	70
R_4	57	105

5. Flow control Valve :

Model	Working Pressure (bar)	Flow Range (/pm)
F_1	70	0-4.1
F_2	**105**	**0-4.9**
F_3	105	0-16.3
F_4	70	0-24.6

6. Directional Control Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
D_1	350	19
D_2	210	38
D_3	210	76

7. Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
C_1	210	15.2
C_2	210	30.4
C_3	210	76

8. Pilot Operated Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
PO_1	210	19
PO_2	210	38
PO_3	210	76

9. Cylinder-(Max Working Pressure-210 bar)

Model	Bore dia. (mm.)	Rod dia (mm)
A_1	25	12.5
A_2	40	16
A_3	50	35
A_4	75	45
A_5	100	50

10. Oil Reservoirs :

Model	Capacity (litres)
T_1	40
T_2	100
T_3	250
T_4	400
T_5	600

Total No. of Questions : 12]

SEAT No. :

P2880

[Total No. of Pages :3

[5354]-84

B.E. (Automobile)

PRODUCT DEVELOPMENT AND COSTING

(2008 Pattern) (Semester - II) (Elective - III (D))

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) What are the objectives of product development organization? Explain in brief. **[8]**

b) Explain the product planning process with block diagram. **[8]**

OR

Q2) a) What do you mean by front end process explain. **[8]**

b) Explain AFM Development Process. **[8]**

Q3) a) Write short note on importance of needs in the organization. **[6]**

b) Explain the procedure of establishing the product specification & how to set the final specifications? **[10]**

OR

Q4) a) How to identify the customer needs? Explain in detail. **[8]**

b) Briefly explain about the documentation process of interaction with customers. **[8]**

P.T.O.

Q5) a) What are the benefits of structured method? **[6]**

b) Explain the activity generation concept. **[6]**

c) Explain the benchmarking process of related products. **[6]**

OR

Q6) a) Explain the five step method to clarify the problem. **[10]**

b) Write a short note on following:

i) Concept classification tree **[4]**

ii) Concept combination table **[4]**

SECTION - II

Q7) a) Explain the procedure of establishing the Architecture of the Chunk. **[8]**

b) Explain the types of modularity. **[8]**

OR

Q8) a) Write a short note on product development & costing. **[8]**

b) How to manage the trade-off between differentiation and commonality? **[8]**

Q9) a) Explain the procedure of assessing the quality of industrial design. **[8]**

b) Write a short note on Design for Manufacturing. (DFM) **[8]**

OR

Q10)a) How to assess the need & expenditure of industrial design. **[10]**

b) Write a short note on Ergonomic Needs, Aesthetic Needs in industrial design.` **[6]**

Q11)a) How to estimate the manufacturing costs, explain in brief. **[8]**

b) Explain the impact of DFM on development time & cost. **[10]**

OR

Q12) Write short note on the following:

a) Qualitative Analysis. **[6]**

b) Quantitative Analysis. **[6]**

c) Economics analysis process. **[6]**

Total No. of Questions : 12]

SEAT No. :

P2828

[Total No. of Pages : 3

[5354] - 9

B.E. (Civil)

MATRIX METHODS OF STRUCTURAL ANALYSIS

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Your answers will be valued as a whole.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary,.***

SECTION - I

Q1) a) Describe how numerical methods helps in inversion matrix. And explain Guass-Seidel iteration method. **[8]**

b) Explain Computer Algorithm & Programming aspects. **[8]**

OR

Q2) a) Solve the following equations by Gauss Elimination Method. **[10]**

$X_1 - 0.4X_2 + 0.8\ X_3 = 1$

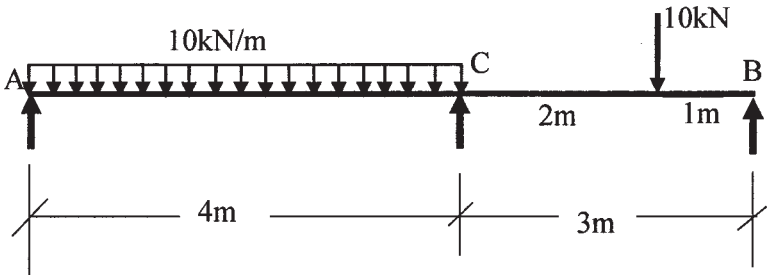
$-2X_1 + X_2 + X_3 = 1$

$X_1 + 0.25\ X_2 = 1.5$

b) Write a note on “ill conditioned matrix”. **[6]**

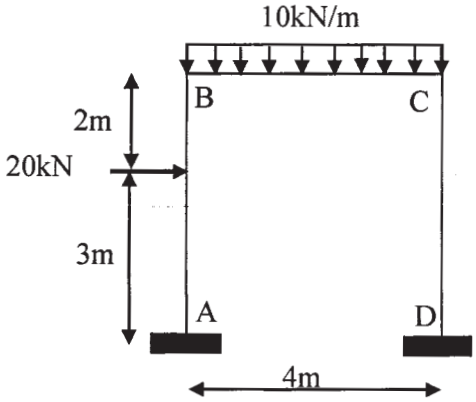
P.T.O.

Q3) Analyze the beam shown below by flexibility method (EI constant). **[18]**

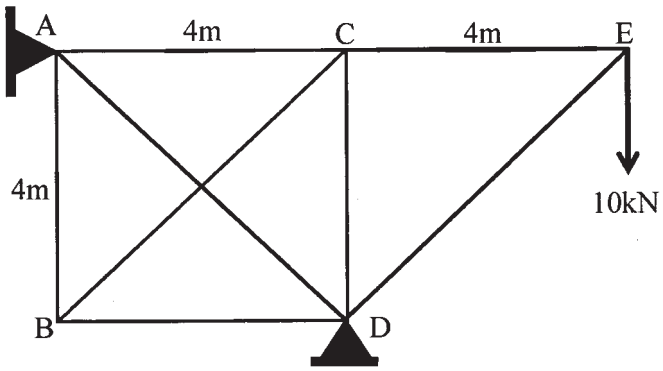


OR

Q4) Analyze the portal frame using Flexibility Method (EI Constant). **[18]**



Q5) Analyze the truss by Flexibility Method (EI Constant). **[16]**



OR

Q6) Analyze the beam shown in Ex. 3 by Stiffness Method (EI is Constant). **[16]**

SECTION - II

Q7) Write note on: **[16]**

a) Force method of Structural Analysis.

b) Effective node numbering.

OR

Q8) Describe member and structure approach and explain how support conditions are accounted in both approaches. **[16]**

Q9) Explain need of stiffness method for analysis of orthogonal grid structure and also describe properties and special characteristics of stiffness matrix of a structure. **[18]**

OR

Q10) Using first principles, establish relationship between local and global stiffness matrix of portal Frame member. State clearly transformation matrix. **[18]**

Q11) a) Explain stiffness method for analysis of structure in space. **[10]**

b) Write a note on substructure technique. **[6]**

OR

Q12) Write a note on: **[16]**

a) Software applications for analysis of skeletal structures.

b) Importance of band width in stiffness analysis.

Total No. of Questions : 12]

SEAT No. :

P2881

[Total No. of Pages :3

[5354]-91

B.E. (Electronics)

ELECTRONIC SYSTEM DESIGN

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 Q.9 or Q.10, Q.11 or Q.12. questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define the term "Ergonomics'. State the objectives of ergonomics. Explain the different design considerations wrt to ergonomics. **[10]**

b) Explain the different environmental tests carried out on electronic product. **[8]**

OR

Q2) a) What is the role of **[8]**

i) R & D engineer

ii) Quality Assurance department

b) Explain the terms

i) Reliability

ii) Quality

iii) MTBF

Also explain the various schemes to improve the reliability of system.**[10]**

P.T.O.

Q3) a) State & explain important specifications of ADC from design point of view. **[8]**

b) Discuss the important factors to be considered while selecting OP-AMP in signal conditioning. **[8]**

OR

Q4) a) Explain in detail the error budget analysis. **[8]**

b) What are the different types of DAC? Explain the important characteristics of DAC. **[8]**

Q5) a) State the important factors to be considered while selecting microcontroller for a particular application. **[8]**

b) Design a four channel temperature scanner using suitable sensors, microcontroller & LCD display. Specify the ranges of temp & assumptions if any in this design. **[8]**

OR

Q6) a) Explain the interface examples for HBLED & relays with microcontroller. **[8]**

b) compare the different microcontroller architectures. **[4]**

c) Explain

i) I^2C ii) SPI in brief. **[4]**

SECTION - II

Q7) a) Explain the different factors affecting the choice bet^n assembly & high level language. **[8]**

b) What are the features of **[6]**

i) Algorithm

ii) Flowchart

c) What is debugging? Explain the process of debugging. **[4]**

OR

Q8) a) Using neat block diagram explain the different stages of software development.. **[8]**

b) Write notes on

i) In-circuit simulator

ii) Compiler

iii) Software Constructs

iv) Real time software **[10]**

Q9) a) Discuss the PCB design rules for high speed digital circuits. **[8]**

b) Estimate the parasitic values for the following geometries of PC track

i) Resistance of 15 cm longe cu track with 0.6 mm width on a std. 35 micron cu-clad laminate. Take $\rho = 1.72 \times 10^{-6}\ \Omega.cm$

ii) Capacitance of two tracks running on opposite face of a double sided PCB with width 2.00mm, length 10cm, PCB laminate thickness 1.6 mm of Er = 3.5. **[8]**

OR

Q10)a) Write notes on

i) Shielding

ii) Grounding

iii) Guarding

iv) Signal integrity **[12]**

b) Explain the importance of EMI testing. **[4]**

Q11)a) With suitable example explain how AC & DC analysis, Sensitivity analysis is carried out. **[8]**

b) Enlist the capabilities of

i) Logic analyzer

ii) MSO **[8]**

OR

Q12)a) Explain the vibration & shock test to be carried out on elctronic product. **[8]**

b) Define EMC & its importance in product development. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2882

[Total No. of Pages :3

[5354]-92

B.E. (Electronics)

VLSI DESIGN

(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any 3 questions from section I and 3 questions from section II.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1)a) Explain the concept of strong 0,1 & how it is applied on transmission gate. Draw 8:1 multiplexer using Transmission gates. **[9]**

b) What are different types of power dissipation in CMOS? Derive the expression for Dynamic Power dissipation. **[9]**

OR

Q2) a) Explain the following terms (Any three) **[9]**

i) Hot election effect

ii) Body effect

iii) Velocity saturation

iv) Noise margin

b) Design CMOS combo logic for Z = (D+A+E) (B+C) & Calculate the area required for implementation Assume suitable data. **[9]**

P.T.O.

Q3) a) Explain with circuit diagram SRAM, DRAM & Flash memory Cells. **[10]**

b) Explain the role of memories in PLD **[6]**

OR

Q4) a) Describe the basic CMOS RAM architecture & associated circuitry. **[8]**

b) What do you mean by flash memory? Draw the circuit diagram & explain the read & write operation of SRAM cell. **[8]**

Q5) a) What is the need of package? Explain package declaration & package body with suitable VHDL example. **[8]**

b) Explain the following terms with examples (Any Two) **[8]**

i) Wait statement

ii) Resolution function & operation overloading

iii) Synthesizable & Non synthesizable statements

iv) Delays in VHDL

OR

Q6) a) Compare functions & procedure. Write a VHDL code which adds two 8 bit vectors & returns 9 bit sum. **[8]**

b) What are the different types of state machines? Explain the strength & weakness of each type. **[8]**

SECTION - II

Q7) a) What do you mean by configuration in PLD? What are the methods of configuration? **[8]**

b) With neat schematic, explain the architectural building blocks of FPGA. Give limitation of FPGA over CPLD. **[8]**

OR

Q8) a) Draw the block diagram & explain the architecture of CPLD. **[10]**

b) Explain in detail, different types of ASIC. **[6]**

Q9) a) Explain the concept of controllability & observability with suitable examples. **[8]**

b) Explain the following terms (Any 2) **[8]**

i) Partial Scan & full scan

ii) Stuck at '1' & stuck at '0'

iii) LFSR

iv) J.TAG

OR

Q10)a) What is the necessity of boundary scan? Explain with suitable examples. List JTAG pins **[8]**

b) What is the need for design for Testability? Explain the different electrical faults. **[8]**

Q11)a) List & Explain different signal integrity issues. **[6]**

b) Explain power distribution & power optimization Techniques. **[12]**

OR

Q12)a) Write short note on (Any Two) **[10]**

i) Power optimization Techniques

ii) Inter connect Routing Techniques

iii) EMI immune design

b) What is the need of multiphase clock? Drawn the schematic & explain the method of implementation. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2883

[Total No. of Pages :3

[5354]-93

B.E. (Electronics)

EMBEDDED SYSTEMS

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With reference to following characteristics, explain an example of embedded system. **[9]**

i) Single function

ii) tightly constrained

iii) Reactive and real time

b) How design metric compete with each other, explain with an example.**[9]**

OR

Q2) a) Explain process of software Development in embedded system. **[9]**

b) What is zig-bee protocol? Explain any application for it . **[9]**

Q3) a) How RISC architecture is different than CISC? Justify use of RISC architecture in embedded system. **[8]**

b) With a typical embedded application, explain criterion for processor selection **[8]**

P.T.O.

OR

Q4) a) What is interrupt latency? What are different methods to reduce interrupt latency **[8]**

b) What is significance of following memory types in embedded systems. **[8]**

i) NVRAM

ii) ROM

iii) EEPROM

iv) Flash

Q5) a) With neat diagram explain data flow model of ARM 7 architecture. **[8]**

b) What is banked registors? with the help of programming model explain registor organization of LPC 2148. **[8]**

OR

Q6) a) Explain features of LPC 2148. **[8]**

b) With the help of block diagram explain architecture of LPC 2148. **[8]**

SECTION - II

Q7) a) With an interfacing diagram, explain 16 × 2 LCD interfacing with LPC 2148. Write an embedded C program to display 'EMBEDDED' on LCD display. **[8]**

b) Explain following registers of LPC 2148. **[8]**

i) ADDR

ii) ADCR

iii) IOSET

iv) PINSEL

OR

Q8) a) What is embedded C? How it is different than C? **[8]**

b) Explain UART programming steps in LPC 2148. **[8]**

Q9) a) What is multitasking? Explain various methods of multitasking in µcos - II **[8]**

b) What is RTOS? How it is different than traditional OS **[8]**

OR

Q10)a) What is semaphore? explain resource management with semaphore. **[8]**

b) What is priority inversion problem? what is remedial solution to avoid this problem. **[8]**

Q11)a) What is message mailbox? explain API used for mailbox in µcos-II **[9]**

b) With reference to Hardware, Software and required I/O device. Explain case study of digital camera. **[9]**

OR

Q12)a) What is memory management in µcos-II? What are API used in µcos-II **[9]**

b) Explain cruise control system w.r.t. **[9]**

i) Hardware /processor

ii) Control algorithm

iii) I/O device requirement

Total No. of Questions : 12]

SEAT No. :

P2884

[Total No. of Pages :3

[5354]-95

B.E. (Electronics)

ADVANCED POWER ELECTRONICS

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from section - I and 3 questions from section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain working of single phase series converters. **[8]**

b) Explain power factor conditioning of diode rectifiers. **[8]**

OR

Q2) a) Explain EMI and line power quality problems of thyristor converters. **[8]**

b) Explain working of double sided PWM converter system. **[8]**

Q3) a) Explain indirect vector control method of induction motor. **[8]**

b) Explain cycloconverter based induction motor drive. **[8]**

OR

Q4) a) Explain adaptive control in induction motors. **[8]**

b) Explain with block diagram microcontroller based DC motor drive. **[8]**

P.T.O.

Q5) a) Explain staircase, harmonic injection and trapezoidal advanced modulation techniques used in inverters. **[10]**

b) Explain operation of cascade type Multilevel inverter and explain its features. **[8]**

OR

Q6) a) Explain working of diode clamped type Multi-level inverter and state its features and advantages. **[10]**

b) Write a note on Z source inverters. **[8]**

SECTION - II

Q7) a) Explain working of low dropout regulators. **[8]**

b) Explain with circuit diagram and waveforms working of ZVS Resonant converter. **[8]**

OR

Q8) a) Write a note on hot swappable redundant power supplies. **[8]**

b) Explain concept of soft switching and operation of parallel resonant converter (PLR). **[8]**

Q9) a) Explain operation of variable wind energy conversion system. **[8]**

b) Write a note on Battery chargers. **[8]**

OR

Q10)a) Explain operation of Traction drives. **[8]**

b) Explain operation of Photovoltaic energy conversion system. **[8]**

Q11)a) Define power quality and energy audit in detail. **[10]**

b) Explain operation of Flexible AC Transmission System (FACTS). **[8]**

OR

Q12)a) What are the various power line disturbances and its remedies? **[10]**

b) Explain operation of HVDC transmission system. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2885

[Total No. of Pages :3

[5354]-96

B.E. (Electronics)

BIOMEDICAL INSTRUMENTATION

(2008 Pattern) (Elective - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from section. I and section II.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the basic component of medical instrumentation system with help of block diagram. **[10]**

b) Define Bioelectric potential. Give full form of the following **[8]**

i) EKG

ii) EEG

iii) EMG

iv) ERG

v) EOG

vi) EGG

OR

Q2) a) Write short note on active & passive transducer used for measurement of bio signal. **[10]**

b) List different Bio potential electrode. Explain drawback of surface electrode. **[8]**

P.T.O.

Q3) a) Explain α, β, θ, δ in relation 'with EEG. **[8]**

b) What are the different components of central nervous system? Explain in detail. **[8]**

OR

Q4) a) Explain Basic block diagram of EEG. **[8]**

b) Explain effect of various artifacts on recording of biomedical signals. **[8]**

Q5) a) Give the salient feature of electromagnetic blood flow meter & explain it. **[8]**

b) With block schematic explain finger plethysmography for peripheral pulse monitoring **[8]**

OR

Q6) a) Explain with block diagram Automatic B.P. machine. **[8]**

b) Explain concept of phonocardiography with the help of basic heart sounds & primary signal characteristic. **[8]**

SECTION - II

Q7) a) Discuss DC & AC defibrillators while explaining term fibrillation & necessity in controlling same. **[10]**

b) What is systolic & diastolic pressure? Explain non invasive blood pressure measurement system. **[8]**

OR

Q8) a) Classify pacemaker on the basis of pacing modes & explain in brief. **[10]**

b) What is important of grounding and shielding? Explain grounding & shielding techniques for medical equipment. **[8]**

Q9) a) What are the components of pulse oximeter probe? Explain analog signal processing by pulse oximeter. **[8]**

b) Describe the working of Flame photometer. **[8]**

OR

Q10)a) Name different methods of cell counting. Explain any one in detail. **[8]**

b) Write short note on blood gas analyzer. **[8]**

Q11)a) Explain CT scanner working principle and scanning system. **[8]**

b) Explain merits & demerits of MRI system. **[8]**

OR

Q12)a) State the three process to form LASER beam. Explain any one in detail with help of diagram. **[8]**

b) Explain operation of X-ray machine with help of neat block diagram. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2886

[Total No. of Pages :2

[5354]-97

B.E. (Electronics Engg.)

MECHATRONICS

(2008 Pattern) (Elective -I) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer three questions from section. I and 3 questions form section II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Figures to the right side indicate full marks.***

SECTION - I

Q1)a) Define Mechatronics system. Explain any two components with their functions. **[8]**

b) Explain the key elements of mechatronics in detail. **[8]**

OR

Q2) a) Explain the step wise design procedure for any one mechatronics system. **[8]**

b) Explain Elastic system modeling in detail. **[8]**

Q3) a) Explain in detail LVDT for pressure measurement. **[8]**

b) What is model? Explain simple dynamic model. **[8]**

OR

Q4) a) Explain proximity sensor in detail. **[8]**

b) Write short note on DC motors and servo motors. **[8]**

P.T.O.

Q5) a) Explain selection criterion for different level sensors used in mechatronics system. **[9]**

b) Define the term PLC. Write the different specifications of PLC. **[9]**

OR

Q6) a) Explain variable frequency drives and drive system load calculation with reference to mechatronic system. **[9]**

b) Write short note on pneumatic and hydraulic system. **[9]**

SECTION - II

Q7) a) Explain the conceptual design of mobile Robot. **[8]**

b) Explain RS232 standard in detail. **[8]**

OR

Q8) a) Write short note on HART protocol. **[8]**

b) Explain the key elements of controlled mechatronics system in detail. **[8]**

Q9) a) Explain UART in detail. **[8]**

b) Write short note on RS485 and IEEE 488 - GPIB. **[8]**

OR

Q10)a) Explain the operation of CNC machine. **[8]**

b) Explain use of computers and concept of real time in mechatronics. **[8]**

Q11)a) Draw and explain multichannel data logger. **[9]**

b) Write short note on signal conditioning and signal conversion. **[9]**

OR

Q12)a) Explain in detail working of copying machine. **[9]**

b) Explain in detail data acquisition system. **[9]**

Total No. of Questions : 12]

SEAT No. :

P2887

[Total No. of Pages :3

[5354]-98

B.E. (Electronics)

ADVANCED COMPUTER ARCHITECTURE (Theory)

(2008 Pattern) (Elective -II) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer-books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1)a) What are performance matrices and measures used for parallel computer? Explain. **[8]**

b) Write short note on instruction level parallelism and thread level parallelism. **[8]**

c) What is cluster computing? **[2]**

OR

Q2) a) Explain flynn's classification of parallel computer architecture in detail.**[8]**

b) State various applications of parallel processing. Explain application of parallel processing in weather forecasting. **[8]**

c) Explain throughput w.r.t. pipeline processing. **[2]**

Q3) a) What are different types of hazards caused in pipeline? How can these hazards be detected and resolved? **[8]**

b) Explain VLIW processor with help of diagram. **[8]**

P.T.O.

OR

Q4) a) Compare **[8]**

i) Superscalar & VLIW processor

ii) Static & Dynamic pipeline

b) What do you mean by EPIC? State & Explain features of EPIC. **[8]**

Q5) a) What are the issues in vector processing? Explain. **[8]**

b) Explain pipeline chaining with example. **[8]**

OR

Q6) a) Explain vector loops and pipeline chaining. **[8]**

b) State desirable features of parallel languages. **[8]**

SECTION - II

Q7) a) Explain cube interconnection network and hypercube interconnection network. **[10]**

b) Explain SIMD architecture. **[8]**

OR

Q8) a) Explain static & dynamic network with respect to interconnection of networks. **[10]**

b) Explain parallel sorting algorithm for array processor. **[8]**

Q9) a) Explain loosely & tightly coupled multiprocessor system with example. **[8]**

b) Give typical architecture for massively parallel processor (MPP). Explain in detail. **[8]**

OR

Q10)a) Explain in detail chip multiprocessing. **[8]**

b) Write short note on inter processor communication and synchronization. **[8]**

Q11)a) Explain following terms w.r.t. multithreading. **[8]**

i) Latency

ii) Context switching overhead

iii) Interleaved multithreading

iv) Latency hiding.

b) Compare synchronous and asynchronous message passing. **[8]**

OR

Q12)a) What is concept of shared memory programming? Explain. **[8]**

b) What are typical multithreading issues. Discuss possible solutions. **[8]**

Total No. of Questions : 12]

SEAT No. :

P2888

[Total No. of Pages :3

[5354]-99

B.E. (Electronics)

ENTREPRENEURSHIP AND BUSINESS PLANNING

(2008 Pattern) (Elective -II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are characteristics of successful entrepreneur? **[8]**

b) State financial and non-financial goals in business. **[6]**

c) How are entrepreneurs different from employees? **[4]**

OR

Q2) a) Explain four types of sales transaction. **[8]**

b) How is brain stroming different from consenses building? **[6]**

c) State advantages of entrepreneurship. **[4]**

Q3) a) What is role of government in market economy? **[8]**

b) Explain fixed cost and variable cost. **[4]**

c) Explain marginal benefit and marginal cost. **[4]**

OR

P.T.O.

Q4) a) State advantages and disadvantages of owning a Franchise. Explain a Franchise with an example. **[12]**

b) Explain : command economy and market economy. **[4]**

Q5) a) What are some reasons bank may reject a loan application? **[6]**

b) What are some strategies for maintaining customer loyalty? **[4]**

c) Write a short note on-business plan. **[6]**

OR

Q6) a) What does cash flow statement show? What is best case and worst case cash flow statement? **[8]**

b) What is market research? Explain primary and secondary market research. **[8]**

SECTION - II

Q7) a) Explain steps involved in hiring employees. **[8]**

b) Explain in brief different types of pays. **[6]**

c) What are advantages of computerized record keeping? **[4]**

OR

Q8) a) Explain in brief :

i) Organizational structure **[5]**

ii) Evaluation procedure **[5]**

b) Explain in brief :

i) Types of Journals **[4]**

ii) Training Techniques **[4]**

Q9) a) What are some ways you can improve your cash flow? **[8]**

b) State types of professionals that provide financial management assistance.Explain services provided by financial experts. **[8]**

OR

Q10)a) What are advantages of World Wide Web? What are some of the things a Web site should include? **[8]**

b) Write a short note on : technological items. **[8]**

Q11)a) What is an international business plan? What should it include? **[8]**

b) Write a short note on: Business ethics. **[8]**

OR

Q12)a) What is responsibility of a lawyer in your business? **[8]**

b) What are responsibilities entrepreneurs have to suppliers, creditors and investors? **[8]**