

Total No. of Questions : 12]

SEAT No. :

P4000

[Total No. of Pages : 3

[5353]-1

B.E. (Mechanical Engineering)

**INDUSTRIAL ENGINEERING AND TECHNOLOGY
MANAGEMENT**

(2008 Pattern) (302044)

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) *Assume Suitable data if necessary.*

SECTION - I

- Q1)** a) What Maslow's hierarchy needs and Explain theory of contingency. [8]
b) Illustrate different functions of management. [8]

OR

- Q2)** a) Discuss concept of management and contribution of Taylor's scientific management. [8]
b) Explain what do you understand by industrial engineering? [8]

- Q3)** a) Explain in brief, Single Facility Location Problem. [8]
b) Enlist the types of Plant Layout and explain Product Layout in detail. [8]

OR

- Q4)** a) Discuss different factors affecting the plant location planning. [8]
b) Write a short note on: Principles of Good Plant Layout and it application. [8]

P.T.O

- Q5)** a) Discuss different factors affecting Productivity and explain Productivity Models [10]
b) Discuss Time Study Procedure in detail. [8]

OR

- Q6)** Write a short note on: (any three) [18]
a) Aggregate Production Planning
b) Different leadership Approach/Styles with examples
c) Concept of managerial grid with example
d) PMTS

SECTION - II

- Q7)** a) Explain Process Technology and Product Technology with appropriate examples. [8]
b) Impact of Technology on Society and Business [8]

OR

- Q8)** a) Write a short note on: Evolution and Growth of Technology [8]
b) Meaning of Technology Management and discuss role and significance of technology and management [8]

- Q9)** a) Explain exploratory technological forecasting techniques [8]
b) Explain technology monitoring process [8]

OR

- Q10)**a) Explain what you mean by morphological analysis by stating its applications. [8]
b) Explain four phases of "S" curve with proper example [8]

- Q11)**a) Explain technology diffusion process [8]
b) Explain in detail the framework for formulating technology strategy [10]

OR

Q12) Write short notes on the following: (any three)

[18]

- a) Key principles for developing technology strategy
- b) Steps used to adopt an appropriate technology for a particular application
- c) Status of IPR Activities in India,
- d) Technology transfer and its categories.



Total No. of Questions : 12]

SEAT No. :

P4006

[Total No. of Pages : 2

[5353]-10
T.E. (Electronics)
SENSORS & INTERFACES
(2008 Pattern) (Semester - 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 full marks.*
- 5) *All questions carry equal 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) Explain principle of flow measurement. Describe Pitot tube used for flow measurement. **[8]**
b) Explain various types of optical proximity sensors. **[8]**
OR
- Q2)** a) Explain with neat diagram working of a combination type pH electrode. **[8]**
b) Explain selection criterion for choosing a sensor. **[8]**
OR
- Q3)** a) Explain the use of Wheatstone's Bridge along with instrumentation amplifier as a signal conditioning circuit. **[8]**
b) Explain any one technique for level and humidity measurement. **[8]**
OR
- Q4)** a) Explain with neat diagram I/P converter and P/I converter. **[8]**
b) Write a short note on SMART transmitter. **[8]**
OR
- Q5)** a) What are the different types of ADCs? Explain any one of them. Write a note on specifications of ADC. **[9]**
b) Describe working of R-2R ladder type DAC. How it is advantageous over weighted register DAC. **[9]**

P.T.O.

OR

- Q6)** a) Describe working of a typical flash ADC for n bit operation. [9]
b) Enlist different types of DAC and give specifications of DAC. Explain any one type of DAC. [9]

SECTION - II

- Q7)** a) Explain the block diagram of data logger & make comparison between DAS and data logger. [8]
b) Write short note on : [10]
i) IEEE 488 standard.
ii) I²C bus

OR

- Q8)** a) Write short note on foundation field bus. [8]
b) Explain multichannel DAS and enlist its objectives and application. [10]

- Q9)** a) Explain with neat diagram pressure control valves. [8]
b) Explain following types of valves with neat diagram. [8]
i) Spool valve
ii) Poppet valve

OR

- Q10)** a) Explain principle of operation of DC motor. State various types of D.C. motors. [8]
b) Explain lift system to move the load up and down using pneumatic actuators. [8]

- Q11)** a) With block diagram explain PLC architecture. [8]
b) Explain the PLC operating cycle. [8]

OR

- Q12)** a) Explain current source & current sink configuration of input & output channel. [8]
b) With suitable assumptions draw the block diagram of a bottle filling plant and develop a PLC ladder diagram for the automatic operation of bottle filling plant. [8]



Total No. of Questions : 12]

SEAT No. :

P4007

[Total No. of Pages : 3

[5353]-11
T.E. (Electronics Engg.)
MICRO COMPUTER BASED SYSTEMS
(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) *Assume suitable data, if necessary.*

SECTION - I

- Q1)** a) Draw and explain Internal Block Diagram of 8086 microprocessor. [8]
b) Explain function of following pins. [8]
- | | |
|-----------|---------|
| i) READY | ii) NMI |
| iii) IO/M | iv) ALE |

OR

- Q2)** a) Explain the following addressing modes of 8086 processor with suitable example. [8]
- | | |
|------------------------|-------------------|
| i) Register | ii) Immediate |
| iii) Register Indirect | iv) Based Indexed |
- b) Draw the bit pattern of flag register and explain each flag with suitable example with 8086 processor. [8]
- Q3)** a) Explain following instructions with suitable example. [8]
- | |
|----------|
| i) CMPS |
| ii) PUSH |
| iii) ADC |
| iv) ROL |
- b) Draw and explain interrupt structure of 8086 processor in detail. [8]

P.T.O.

OR

- Q4)** a) Write an ALP for the addition of a series of 8 bit numbers. The series contains 100 (numbers) [8]
b) Write an ALP to perform a one byte BCD addition. [8]

- Q5)** a) Draw and explain the register set of 80386 and explain in brief a typical function of each of the registers. [10]
b) What is paging in 80386? Explain how physical address is generated using paging? [8]

OR

- Q6)** a) What do you mean by descriptor table? Explain its format. And how physical address is calculated using descriptors. [10]
b) Write a short note on protected mode and virtual mode of 80386. [8]

SECTION - II

- Q7)** a) Explain with block diagram IBM PC system based mother board. [10]
b) Write a short note on : [8]
i) BIOS ii) PS2

OR

- Q8)** a) Explain the different pins associated with USB interface. What are the different types of data transfers associated with USB? [10]
b) List the specifications of the following : [8]
i) PCI bus ii) EISA bus

- Q9)** a) Draw and explain ARM7 core data flow model. [8]
b) Explain three stage and five stage pipeline in ARM processor. [8]

OR

- Q10)** a) Explain the following instructions of ARM7 processor. [8]
i) LDR ii) UMULL
iii) BL iv) SBC
b) List and explain privileged and non-privileged modes in ARM processor. [8]

- Q11)** a) State and explain various design steps involved in designing Data acquisition system. [8]
- b) Interface a DC motor to 8086 / ARM7 processor and draw the flow chart. [8]

OR

Q12) Design 8086 / ARM7 based system to sense temperature from LM-35 (temperature sensor) and display it on LCD. [16]

- a) Design signal conditioning circuit.
- b) Draw the complete interfacing diagram.
- c) Draw the flow chart.



[5353]-12

T.E. (Electronics & Telecommunication Engineering)

CONTROL SYSTEMS

(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 book.
- 3) Neat diagrams must be drawn whenever necessary.
- 4) Figures to the right indicate full marks.
- 5) Assume suitable data if necessary.
- 6) Use of logarithmic tables slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.

SECTION - I

- Q1) a) Explain open loop and closed loop control systems with the help of their block diagrams and real life examples. [8]
- b) Determine the transfer function $Y(s)/R(s)$ for the system shown in figure No.1 [8]

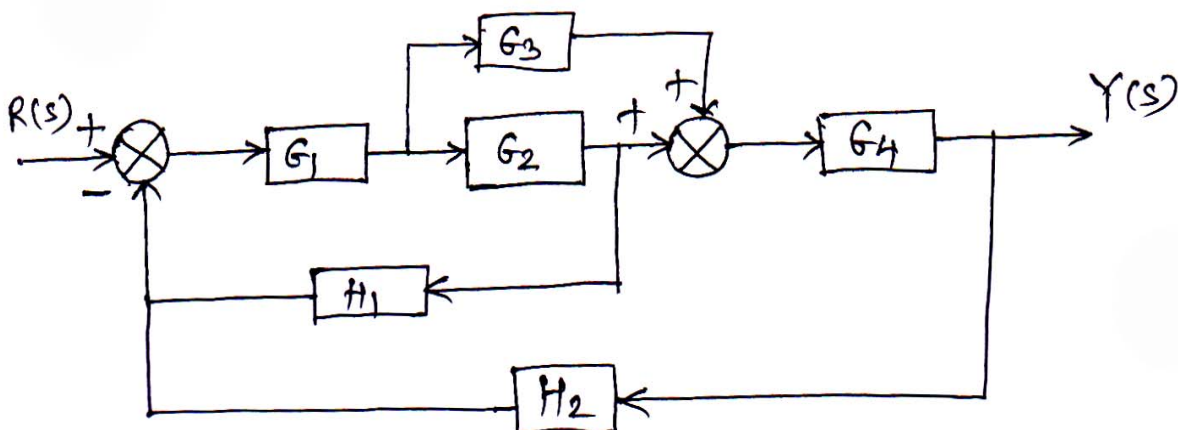
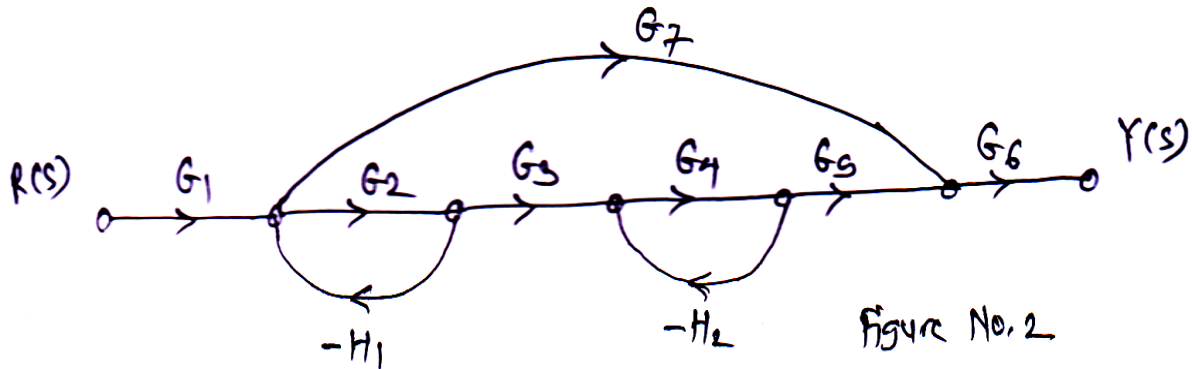


Figure No.1

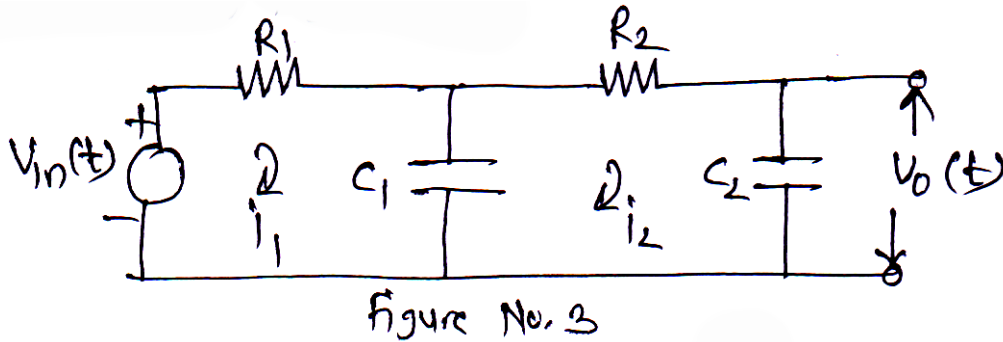
OR

P.T.O.

- Q2) a) Determine the transfer function $Y(s)/R(s)$ for the system shown in figure No. 2 using Mason's gain formula. [8]



- b) Determine the transfer function $V_o(s)/V_{in}(s)$ for the system shown in figure No. 3. [8]



- Q3) a) For the system with closed loop transfer function. [8]

$$G(s) = \frac{100}{s^2 + 6s + 100}$$

Determine $\xi, \omega_n, \omega_d, t_d, t_r, t_p, m_p$ and t_s .

- b) For the unity feedback system with open loop transfer function

$$G(s) = \frac{K}{s(s+2)(s^2+2s+5)} \text{ determine the following :} \quad [8]$$

- Range of K for stability.
- Value of K at marginal stability
- Frequency of oscillations at marginal stability

OR

Q4) a) For the unity feedback system with open loop transfer function $G(s) = \frac{100}{s(s+5)(s^2+2s+10)}$, determine static error coefficient and steady state error for ramp input. [4]

b) Sketch root locus of the unity feedback system with open loop transfer function $G(s) = \frac{K}{s(s+1)(s+3)(s+5)}$. [12]

Q5) a) Determine ξ , w_n , m_r and w_r for the system with closed loop transfer function $G(s) = \frac{64}{s^2+8s+64}$. [6]

b) Sketch Bode Plot for the unity feedback system with open loop transfer function $G(s) = \frac{10}{s(s+2)(s+5)}$ and determine W_{gc} , W_{pc} , gain margin, phase margin, stability of the system. [12]

OR

Q6) a) Explain how stability is analyzed from Bode Plot. [6]

b) Sketch Nyquist plot of the system with open loop transfer function $G(s) = \frac{20}{s(s+2)(s+5)}$. Determine phase crossover frequency, Gain margin and comment on stability. [12]

SECTION - II

Q7) a) Determine state transition matrix of the system with state equation. [8]

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x$$

b) Obtain controllable canonical and observable canonical state models' of the system with transfer function. [8]

$$G(s) = \frac{2s^2 + 10s + 3}{s^3 + 12s^2 + 7s + 2}$$

OR

- Q8) a)** Investigate for complete state controllability and state observability for the system with state space model matrices. [8]

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -4 & -1 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, C = [2 \ 3 \ 5].$$

- b) Derive the formula to convert state model into transfer function and determine that transfer function of the system with state model. [8]

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = [1 \ 3]x$$

- Q9)** Explain different control actions and control modes of PIO controller in detail. [16]

OR

- Q10)a)** Explain architecture of PLC with the help of block diagram. [8]

- b) Explain position and velocity algorithms of digital PIO controller. [8]

Q11) Write short notes on :

- a) Model reference adaptive control. [9]

- b) Digital control systems. [9]

OR

Q12) Write short notes on :

- a) Self tuning regulator [9]

- b) Distributed control system [9]



[5353]-13
T.E. (E & TC)
NETWORK SYNTHESIS AND FILTER DESIGN
(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 Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.
- 3) Use of Electronic pocket calculator is allowed.
- 4) Figures to the right side indicate full marks.
- 5) Assume Suitable data if necessary.

- Q1)** a) Give the complete procedure for testing positive real function. [6]
 b) Determine whether the polynomials $F(s)$ are Hurwitz. [8]
 i) $F(s) = s^4 + s^3 + 2s^2 + 3s + 2$
 ii) $F(s) = s^3 + s^2 + 3s + 3$
 c) For a two port network, define all the transfer functions. [4]

OR

- Q2)** a) Explain the significance of poles and zeros in network synthesis. Also discuss effect of poles and zeros on response. [6]
 b) Determine whether the following function is positive real function. [4]

$$Z(s) = \frac{s + 3}{s^2 + 5s + 4}$$

 c) For the network shown in Fig. 1, find $G_{12}(s)$, $\alpha_{12}(s)$, $Z_{12}(s)$ and $Y_{12}(s)$. [8]

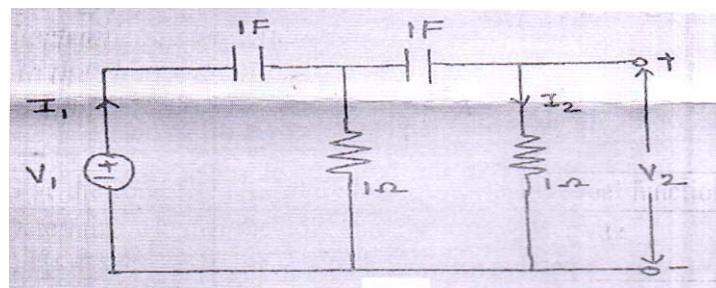


Fig 1

- Q3) a)** Synthesize the following one port network function in both foster forms. [8]

$$Z(s) = \frac{2(s^2 + 3)(s^2 + 9)}{s(s^2 + 4)}.$$

- b) Synthesize the following one port network function in both Cauer forms. [8]

$$Z(s) = \frac{2(s+1)(s+3)}{s(s+2)}.$$

OR

- Q4) a)** List properties of one port RC driving point impedance function. [6]

- b) Indicate with reasons which of the following driving point functions are RC, LC or RL. Out of that realize only RL function in both foster forms. [10]

i) $Z(s) = \frac{s^3 + 2.6s}{s^4 + 4s^2 + 3}$

ii) $Y(s) = \frac{s^2 + 2.5s}{s^2 + 5s + 6}$

iii) $Y(s) = \frac{(s+2)(s+4)}{s(s+3)}$

- Q5) a)** Explain the concept and significance of zeros of transmission in two port network synthesis. Also, prove that all passive ladder networks have minimum phase transfer function. [8]

- b) Synthesize [8]

$$Z_{21}(s) = \frac{2}{s^3 + 3s^2 + 4s + 2} \text{ as a LC ladder with } 1\Omega \text{ termination.}$$

OR

Q6) a) Synthesize the all pass function. [6]

$$\frac{v_o}{v_{in}} = \frac{s^2 - 2s + 5}{s^2 + 2s + 5} \text{ as a lattice network terminated into } 1\Omega.$$

b) Synthesize voltage ratio $\frac{V_2}{V_1} = \frac{s^2 + 1}{s^2 + 2s + 1}$ as a constant resistance bridge T network terminated by 1Ω . [6]

c) Identify the zeroes of transmissions for the network in fig. 2. [4]

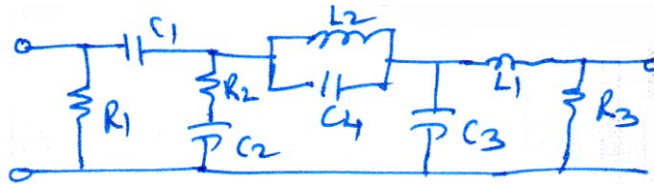


Fig. 2

SECTION - II

Q7) a) Explain the need and concept of magnitude and frequency normalization in context with filter designing. [8]

b) Realize a third order Butterworth response transfer impedance terminated in load of $600\ \Omega$ with a cut off frequency of 10^6 rad/sec. [8]

OR

Q8) a) Compare Butterworth and Chebyshev approximation. [4]

b) Design a Chebyshev approximated low pass filter with not more than 1 dB ripple in pass band and 20 dB attenuation at 2 rad/sec. [12]

Q9) a) What are different biquad feedback topologies used in active filter design. [8]

b) Synthesize a 2nd order high pass filter having cut off frequency 159.15 Hz using the Sallen and Key circuit based on positive feedback. [8]

OR

Q10) a) What is cascade approach in active filter synthesis? Explain in detail and list its advantages. [8]

b) Design a second order Butterworth low pass filter having upper cut off frequency 1KHz. [8]

Q11)a) Define sensitivity and its significance. Derive the property of sensitivity,

$$S_x^{y_1+y_2} = \frac{y_1 S_x^{y_1} + y_2 S_x^{y_2}}{y_1 + y_2}. \quad [8]$$

b) Find the transfer function (V_2/V_1) of a passive network shown in Fig.3. Also compute the sensitivities of K , ω_p and Q_p with respect to elements. [10]

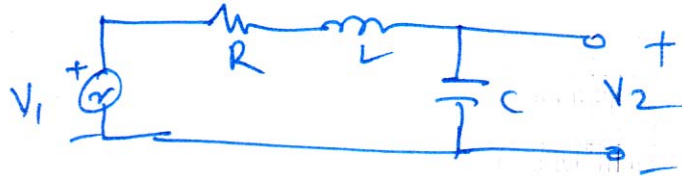


Fig - 3

OR

Q12)a) Describe the properties of op-amp such as dynamic range, slew rate, offset voltage, input bias and input offset currents and common mode signal in context of filter design. [10]

b) The transfer function for a passive RLC circuit is described by [8]

$$\frac{V_o}{V_i} = \frac{s}{C \left(s^2 + \frac{s}{RC} + 1/LC \right)}$$

Compute the sensitivity of K , ω_p , and Q_p

with respect to the passive elements R , L and C .



Total No. of Questions : 12]

SEAT No. :

P4010

[Total No. of Pages : 2

[5353]-14

T.E. (E & TC) (Semester - II)

COMPUTER ORGANIZATION AND ARCHITECTURE

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

SECTION - I

Q1) a) What are condition codes ? Explain use of them. [6]

b) Explain booth's algorithm for 2's complement multiplication with the help of suitable example. [12]

OR

Q2) a) Explain and draw the flow chart for floating point subtraction. [6]

b) Perform the following division using restoring division algorithm.
Dividend = 1100 Divisor = 0011. [12]

Q3) a) Draw and explain I/O interface for an input device. [8]

b) Explain interface between printer and processor. Also explain communication between them. [8]

OR

Q4) a) Explain the following : [8]

i) Programmed I/O

ii) Interrupt driven I/O

b) Draw and explain organization of single bus CPU with control signals. [8]

P.T.O.

- Q5)** a) With the help of block diagram explain the working of 16*1 DRAM. [8]
b) Explained with suitable diagram interleaving of memory. [8]

OR

- Q6)** a) Explain set associative mapped cache with the help of diagram. [8]
b) Explain operation of SDRAM controller with neat block diagram. [8]

SECTION - II

- Q7)** a) Draw flag structure of 8086 processor and explain use of each flag. [8]
b) Explain following instruction of 8086 with suitable example. [10]
i) LOCK
ii) TEST
iii) WAIT
iv) CLD
v) CMPS

OR

- Q8)** a) Draw and explain architecture of 8086. [8]
b) With suitable example explain intersegment and intrasegment jump. [10]

- Q9)** a) Explain real mode of 80386. [8]
b) Explain protection mechanism of 80386. [8]

OR

- Q10)** a) List all the registers used in protected mode of 80386. [8]
b) Explain different mechanism of changing privilege level of 80386. [8]

- Q11)** a) Compare RISC and CISC processor. [8]
b) Draw format of program states register of ARM processor and explain the significance of each bit in it. [8]

OR

- Q12)** a) What is the difference between loosely coupled and tightly coupled multiprocessor system. [8]
b) Draw and explain the 3 stage pipeline of ARM Organisation. [8]



[5353]-15

T.E. (Instrumentation and Control)

ELECTRONIC INSTRUMENTATION

(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) Figures to the right side indicate full marks.
- 4) Use of Calculator is allowed.
- 5) Assume suitable data if necessary.

SECTION - I

- Q1)** a) Draw the block diagram of basic DMM. Explain what is Auto Ranging and Auto Zeroing in VM. [10]
- b) Define the following terms : [8]
- i) Average voltage
 - ii) RMS voltage
 - iii) True RMS voltage
 - iv) Crest factor

OR

- Q2)** a) Explain series substitution and shunt substitution method to measure the unknown impedance using a Q meter. [10]
- b) Calculate the disturbance capacitance in a Q meter based on the given data : [4]
- $f_1 = 2 \text{ MHz}$, $f_2 = 6 \text{ MHz}$.
 $C_1 = 100 \text{ pF}$, $C_2 = 10 \text{ pF}$.
- c) State the advantages and disadvantages of DMM. [4]

- Q3)** a) Explain in detail with suitable diagram. Direct synthesis type of frequency synthesizer. [8]
- b) Draw and Explain the internal block diagram of 8038. [8]

OR

P.T.O.

- Q4)** a) Write short note on : [8]
i) Sampled sine wave type of frequency synthesizer.
ii) PLL type of indirect frequency synthesis.
- b) Explain in detail - Pulse generator. [8]

- Q5)** a) Explain significance of following terms in oscilloscope. [8]
i) Post deflection accelerator
ii) Control grid
iii) Delayed sweep
iv) Focusing anode
- b) Differentiate between : [8]
i) Analog CRO and Digital CRO
ii) Dual Beam and Dual Trace oscilloscope

OR

- Q6)** a) State the different types of probes. Explain the current probe and the attenuator probe. [10]
- b) Explain the roll mode and refresh mode in DSO. [6]

SECTION - II

- Q7)** a) Differentiate between: [10]
i) SAR and Dual slope type of ADC
ii) Binary weighted and R-2R type of DAC
- b) What is quantization error? State its types with the help of neat suitable graphs. [8]

OR

- Q8)** a) With the help of a neat diagram explain working of SAR type ADC. [10]
- b) Draw the diagram of R-2R type DAC considering the digital input of 4 bits. If the digital input is 1011, calculate the value of analog output and explain in detail how it is attained. [8]

- Q9)** a) State and explain the different sources of error in digital instruments. [8]
b) Draw and explain the block diagram of universal counter. [8]

OR

- Q10)** a) Write short note on Digital Capacitance Meter. [8]
b) Explain the totalizing mode, frequency mode and ratio mode in Universal counter. [8]

- Q11)** a) With the help of a neat block diagram. Explain the heterodyne type of spectrum analyzer. [8]
b) Write short note on Virtual Instrumentation, its architecture and give an example. [8]

OR

- Q12)** Write short note on : [16]
a) Distortion meter.
b) Wave analyzer.
c) Virtual Instrumentation.



Total No. of Questions : 12]

SEAT No. :

P4012

[Total No. of Pages : 3

[5353]-16

T.E. (Computer Engineering) (Semester - I)

DATA 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.6, Q.7 or Q.8, Q.9 or Q.10.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable data, if necessary.

SECTION - I

- Q1)** a) Define and explain the concept of continuous and discrete time random variable with example. [4]
- b) Show that impulse response of the matched filter is time reverse and delayed version of input signal. [6]
- c) Find out the CDF of the Gaussian random variable. [6]

OR

- Q2)** a) Compare Binomial, Poisson's, Gaussian's and Reighlay's Probability Models w.r.t. their probability distribution functions. [8]
- b) Define auto correlation function. State and explain any three properties of auto correlation function. [8]

- Q3)** a) Explain the need of synchronizer in digital multiplexing. Draw and explain bit synchronizer. [10]
- b) Explain the operation of Costas Loop synchronization for carrier recovery and Explain significance of "Eye Pattern". [6]

OR

- Q4)** a) Draw the line code formats for 10110100. [8]
- i) RZ unipolar
 - ii) NRZ polar
 - iii) AMI
 - iv) Manchester
- b) Explain sampling theorem. [8]

P.T.O.

- Q5)** a) Evaluate power spectral density of unipolar NRZ and polar RZ codes. Plot the spectrum. [10]
b) Explain in brief all the different types of error correcting techniques. [8]

OR

- Q6)** a) The probabilities of five symbols of a discrete memory less source are 0.35, 0.25, 0.2, 0.15, 0.05. Encode them using Huffman encoding algorithm and find the entropy of above source. [10]
b) Explain the following terms in connection with convolution codes : [8]
i) Code rate and constraint length.
ii) Steady state transitions.
iii) Termination of Trellis diagram.

SECTION - II

- Q7)** a) Explain OSI model and TCP IP model. [10]
b) Explain Bluetooth protocol architecture. [8]

OR

- Q8)** a) What is Wireless LAN and Virtual LAN. Explain DQDB protocol. [10]
b) What is frame relay. Explain ATM in detail. [8]

- Q9)** a) Explain guided transmission media used for communication. [8]
b) Compare and explain : Circuit switching, Message switching and packet switching. [8]

OR

- Q10)** a) Explain function of Repeaters, hubs, NICs, Bridges and Switches. [8]
b) Explain Radio and Micro Waves, Infrared, Light wave, Spread Spectrum Systems. [8]

- Q11)** a) Explain Sliding Window protocol. [4]
b) Write the problems in static and dynamic channel allocation. [6]
c) Explain Collision-free and limited-contention protocols. [6]

OR

Q12) Write a short note. [16]

- a) ALOHA
- b) CSMA
- c) HDLC
- d) Framing



Total No. of Questions : 12]

SEAT No. :

P4013

[Total No. of Pages : 3

[5353]-17

T.E. (Computer)

MICROPROCESSORS AND MICROCONTROLLERS

(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) Compare 80386, 80486, and the Pentium based on architecture. [6]
b) What is Branch Prediction in the Pentium? Explain with diagram. [6]
c) What is the function of each of the following pins? [6]
i) BRDY#
ii) ADS#
iii) BEO# - BE7#

OR

- Q2)** a) Describe cache organization of the Pentium. [6]
b) Which features makes the Pentium, a superscalar processor? Explain in detail. [6]
c) Explain Floating Point Unit of the Pentium? [6]
- Q3)** a) Explain addressing modes of the Pentium. [8]
b) What is the purpose of control registers? Explain significance of CR0 in working of cache and paging unit. [8]

OR

- Q4)** a) With the help of neat diagram, explain non-pipelined read bus cycle of the Pentium. [6]

P.T.O.

- b) List and explain protected mode registers of the Pentium. [6]
- c) Describe any two instructions. [4]
 - i) XADD
 - ii) BTC
 - iii) SWAPB

- Q5)** a) How logical address is translated to linear address in the Pentium. Draw the required data structures. [8]
- b) Describe call gate mechanism in details. Draw the related descriptor formats. [8]

OR

- Q6)** a) How linear address is translated to physical address in the Pentium. Draw the required data structures. [8]
- b) How pages can be protected in the Pentium? Give details. [8]

SECTION - II

- Q7)** a) What is I/O permission bit map? When it is referred? [6]
- b) Explain steps in entering Virtual mode. [6]
- c) Explain nested task in the Pentium. [6]

OR

- Q8)** a) Explain IDT in Pentium in details. How interrupt handling in protected mode is dependent on contents of IDT? [6]
- b) Explain task switch operation through task gate. [6]
- c) Write any six difference between 8086 and virtual 86 mode. [6]

- Q9)** a) Draw and Explain internal RAM organization of 8051. [12]
- b) Explain the function of following pins. [4]
- i) T_1
 - ii) T_0

OR

- Q10)** a) Explain addressing modes of 8051 microcontroller. Explain with suitable example. [8]
- b) Explain following 8051 instructions [8]
- i) MOVC
 - ii) MOVX
 - iii) SETB
 - iv) RETI

- Q11)** a) Write features of 8096 microcontroller. [4]
b) Describe serial port on 8051 with the help of SCON. [8]
c) Explain any two modes of timer operation in 8051. [4]

OR

- Q12)**a) How many interrupt sources are there in 8051? List them & explain interrupt handling mechanism in 8051. [8]
b) Explain IE & IP registers of 8051 microcontroller. [8]



Total No. of Questions : 12]

SEAT No. :

P4014

[Total No. of Pages : 3

[5353]-18
T.E. (Computer)
DIGITAL SIGNAL PROCESSING
(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) Impulse response of DT-LTI system is, $h(n) = (0.9)^n + u(n + 2)$ [6]
- i) Determine the stability of the system
 - ii) Justify whether the system is causal or noncausal.
- b) Determine the output of the LTI system whose input signal and input sample response are given: $x(n) = b^n u(n)$ and $h(n) = a^n u(n)$. [8]
- c) With example explain static and dynamic DT system. [4]

OR

- Q2)** a) Determine a linear convolution between $x(n)$ and $h(n)$
 $x(n) = u(n) - u(n-3)$ and $h(n) = u(n - 1) - u(n - 5) + u(n - 2) - u(n - 4)$. [8]
- b) Determine whether the following systems [10]
- i) $y(n) = x(n^2)$
 - ii) $y(n) = x^2(n)$
- are linear or nonlinear

- Q3)** a) State and prove periodicity property of Fourier transform (DTFT) and discrete fourier transform (DFT). [12]
- b) Determine fourier transform of $x(n) = a^n u(n)$ for $-1 < a < 1$. [4]

P.T.O.

OR

- Q4)** a) Explain clearly the circular convolution. [8]
b) Obtain 4 point circular convolution using DFT and IDFT
 $x(n) = \{ 1, 2, -3, 4 \}$ and $h(n) = \{ 2, 1, 2, 1 \}$. [8]

- Q5)** a) Describe an inverse z-transform using partial fraction method. Determine

$$\text{inverse z- transform of } X(z) = \frac{1 - \frac{1}{2}z^{-1}}{1 - \frac{1}{2}z^{-2}} \quad |z| > \frac{1}{2} \quad [12]$$

- b) Explain in-place computation in FFT. [4]

OR

- Q6)** a) State and prove convolution property of Z-transform. Determine the convolution of the following pair of signals. [12]

$$x_1(n) = \left(\frac{1}{4}\right)^n u(n-1) \text{ and } x_2(n) = [1 + (1/2)^n] u(n)$$

- b) Explain bit-reversal indexing in FFT. [4]

SECTION - II

- Q7)** a) A causal DT system is described by means of pole zero plot having 2nd order zero at $z = 0$ and two poles at $z = 0.5$ and $z = 1$. Sketch the pole zero plot and thereby obtain the system function and difference equation. Find out the impulse response $h(n)$. [8]
b) How to determine the causality and stability from $H(z)$? Illustrate with one example and obtain the impulse response for the same. [8]

OR

- Q8)** a) Explain how the system function is obtained from the general difference equation. State causality and stability conditions w.r.t. $H(z)$. [8]
b) Determine impulse response of a system describe by the difference equation [8]

$$y(n) = x(n) - \frac{1}{4}x(n-1) + \frac{1}{2}y(n-1).$$

Also find magnitude response for the same.

- Q9) a)** Explain Kaiser window for FIR filter design. [8]
- b) Design a second order low pass DT Butterworth filter with cutoff frequency of 1 kHz and sampling frequency of 10^4 samples/sec by using BLT. [10]

OR

- Q10)a)** Design a high pass linear phase FIR filter having cutoff frequency ω_c and window function of, [8]

$$w(n) = \begin{cases} 1, & \text{for } 0 \leq n \leq 6 \\ 0, & \text{otherwise} \end{cases}$$

- b) What is frequency warping effect in BLT? [4]
- c) What are the advantages and disadvantages of digital filters over analog filters. [6]

- Q11)a)** What are the advantages of Direct form-II structure over Direct form-I? [6]

- b) Explain linear phase FIR filter structure and realize the following system function for the same. [10]

$$H(z) = 1 + \frac{2}{3}z + \frac{2}{3}z^{-1}.$$

OR

- Q12)a)** Explain different internal buses present in ADSP 21xx family. [8]

- b) Realize the following system function in cascade form of FIR filter. [8]

$$H(z) = 1 + \frac{2}{4}z^{-1} + \frac{17}{8}z^{-2} + \frac{3}{4}z^{-3} + z^{-4}.$$



Total No. of Questions : 12]

SEAT No. :

P4015

[Total No. of Pages : 3

[5353]-19

T.E. (Computer Engineering)

PRINCIPLES OF PROGRAMMING LANGUAGES

(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) *Answers to the two sections should be written on 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) Explain following characteristics of good programming language: [10]

- i) Orthogonality
- ii) Uniformity
- iii) Implementability
- iv) Readability
- v) Writability

b) What is type checking? Explain static and dynamic type checking. [8]

OR

Q2) a) Why does the use of dynamic scoping imply the need for runtime type checking? [4]

b) What is binding and binding times? What are the different binding times? [6]

c) Explain with suitable example implicit and explicit type conversions. [8]

Q3) a) What are the benefits and limitations of procedural programming languages. [8]

b) Compare C and PASCAL programming languages [8]

OR

P.T.O.

- Q4)** a) Explain the following with reference to PASCAL Programming language: [10]
- i) Scope rules
 - ii) Local and global variable
 - iii) Parameter passing
 - iv) Pointers
 - v) Data Types
- b) Comment on desirable and undesirable characteristics of procedural programming. [6]

- Q5)** a) Compare different features of JAVA and C++ programming languages. [8]
- b) Explain with example multi threading concept used in JAVA. [8]

OR

- Q6)** a) Explain with example concept of exception handling w.r.t JAVA. [8]
- b) Explain different steps involved in socket programming for client server communication in JAVA. [8]

SECTION - II

- Q7)** a) Explain in brief following constructs with respect to .NET framework: [10]
- i) Arrays
 - ii) Interfaces
 - iii) Event Handler
 - iv) Delegates
 - v) Classes and methods
- b) Explain early binding and late binding with example. [8]

OR

- Q8)** a) What is assembly and delegates in C#? Explain with example. [8]
- b) What is the significance of name space and explain it with respect to C#. [8]
- c) Describe in brief structure of C# program. [2]

- Q9)** a) What is relation between resolution and unification? How resolution and unification algorithms work explain with example. [8]
- b) Explain with example rules, facts and queries in prolog. [8]

OR

- Q10)**a) State and explain key features of logical programming specifications. [8]
b) Write note on applications of logical programming language. [8]

- Q11)**a) Explain numeric predicate functions supported by LISP. [6]
b) Explain various data types and data structures supported by LISP. [10]

OR

- Q12)**a) Describe following properties of functional programming language: [8]
i) Lazy function evaluation
ii) Referential transparency
b) Write a LISP function to concatenate two lists. [8]



Total No. of Questions : 12]

SEAT No. :

P4001

[Total No. of Pages : 6

[5353]-2

T.E. (Mechanical)

REFRIGERATION AND AIR-CONDITIONING

(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) *Use of psychrometric chart is allowed.*
- 7) *Assume Suitable data if necessary, state clearly the assumption made.*

SECTION - I

- Q1)** a) Present various processes of vapour compression cycle on T-s and p-h diagram. Name the various processes and derive expression for COP. [8]
- b) Discuss the working of vortex tube refrigeration with neat diagram. What are the limitations of this system over other types? [8]

OR

- Q2)** a) Explain the application of refrigeration systems for: [8]
- i) dairy plant
 - ii) cold storage
- b) Dense (close) air refrigeration operates between pressures of 4 bar and 16 bar. The air temperature after heat rejection to surroundings is 37°C and air temperature at exit of refrigerator is 7°C. The isentropic efficiency of turbine and compressor are 0.85 and 0.8 respectively. Determine [8]
- i) Compressor and turbine work per TR;
 - ii) C.O.P. and;
 - iii) Power required per TR. For air take $\gamma = 1.4$, and $C_p = 1.005$ kJ/kg K.

P.T.O

- Q3)** a) Discuss the effect of suction superheat and condenser subcooling on performance of VCC with the help of p-h or T-s diagram. [8]
- b) A 20 TR vapour compression system has evaporation temperature of 0°C and condensation temperature is 40°C. Determine: [8]
- The mass flow rate of refrigerant.
 - Power required to run the compressor,
 - COP of the system.

Use the properties:

Temp °C	Pressure bar	h_f kJ/kg	h_g kJ/kg	s_f kJ/kg	s_g kJ/kg.K
0	3.08	36.05	187.53	0.142	0.696
40	9.60	74.59	203.2	0.727	0.682

Take C_p for superheated vapour as 0.65 kJ/kg.K.

OR

- Q4)** a) Draw neat diagram of water-ammonia refrigeration system. Explain its working. What is the use of analyser and rectifier in this system? [8]
- b) Draw actual vapour compression cycle with the help of T-s and p-h diagram. Explain its working. [8]
- Q5)** a) Explain Montreal Protocol and Kyoto Protocol. [6]
- b) Explain pumped circulation system with neat diagram. [8]
- c) Explain the advantages of using flash chamber in parallel with evaporator. [4]

OR

- Q6)** a) A vapor compression system using ammonia as refrigerant works between 2 bar and 14 bar. Two flash chambers are fitted in the system at 6 bar and 10 bar and vapours are sent to the respective compressors where these compressors handle only flash gas. If the load on the evaporator is 18 TR, find the power required to run system and its COP. [10]
- What is the COP if it works on simple saturated VCC?
- b) Classify the refrigerants. Give alternatives refrigerants to HCFCs and HFCs. [8]

SECTION - II

- Q7)** a) List psychometric processes and present the analysis of any two processed in detail. [6]
- b) Define the “human comfort” and describe the factors which affect the human comfort. [6]
- c) The amount of air supplied to an air conditioned hall is 300 cmm. The atmospheric conditions are 35° C DBT and 55% RH. The required conditions are 20° C DBT and 60% RH. Find the Sensible Heat and Latent Heat removed from air per minute. [6]

OR

- Q8)** a) Explain ASHRAE comfort chart. [6]
- b) A psychomotor recorded 36°C DBT and 30°C WBT. Calculate [6]
- i) vapor pressure
 - ii) relative humidity
 - iii) specific humidity
 - iv) degree of saturation
 - v) dew point temperature
 - vi) enthalpy of the mixture, if atmospheric pressure is 100 kPa.
- c) Explain: RSHF, GSHF and ESHF. [6]

- Q9)** a) Draw the constructional details of TEV. Explain the working of same. [8]
- b) Give the procedure of installation and testing of central air conditioning system. [8]

OR

- Q10)** a) Explain the working of rolling piston and rotating vane type rotary compressor. Explain the advantages and disadvantages over each other. [8]
- b) Explain different types of evaporators used in refrigeration system. [8]

Q11)a) A circular duct of 400 mm is selected to carry air in an air conditioning space at a velocity of 440 m/min to keep the noise level at desired level. If this duct is replaced by a rectangular duct of aspect ratio of 1.5, find the size of two ducts for equal friction methods when **[8]**

- i) the velocity of air in two ducts is same.
- ii) The discharge of air in two ducts is same.

b) Explain the following freezers for food preservation: **[8]**

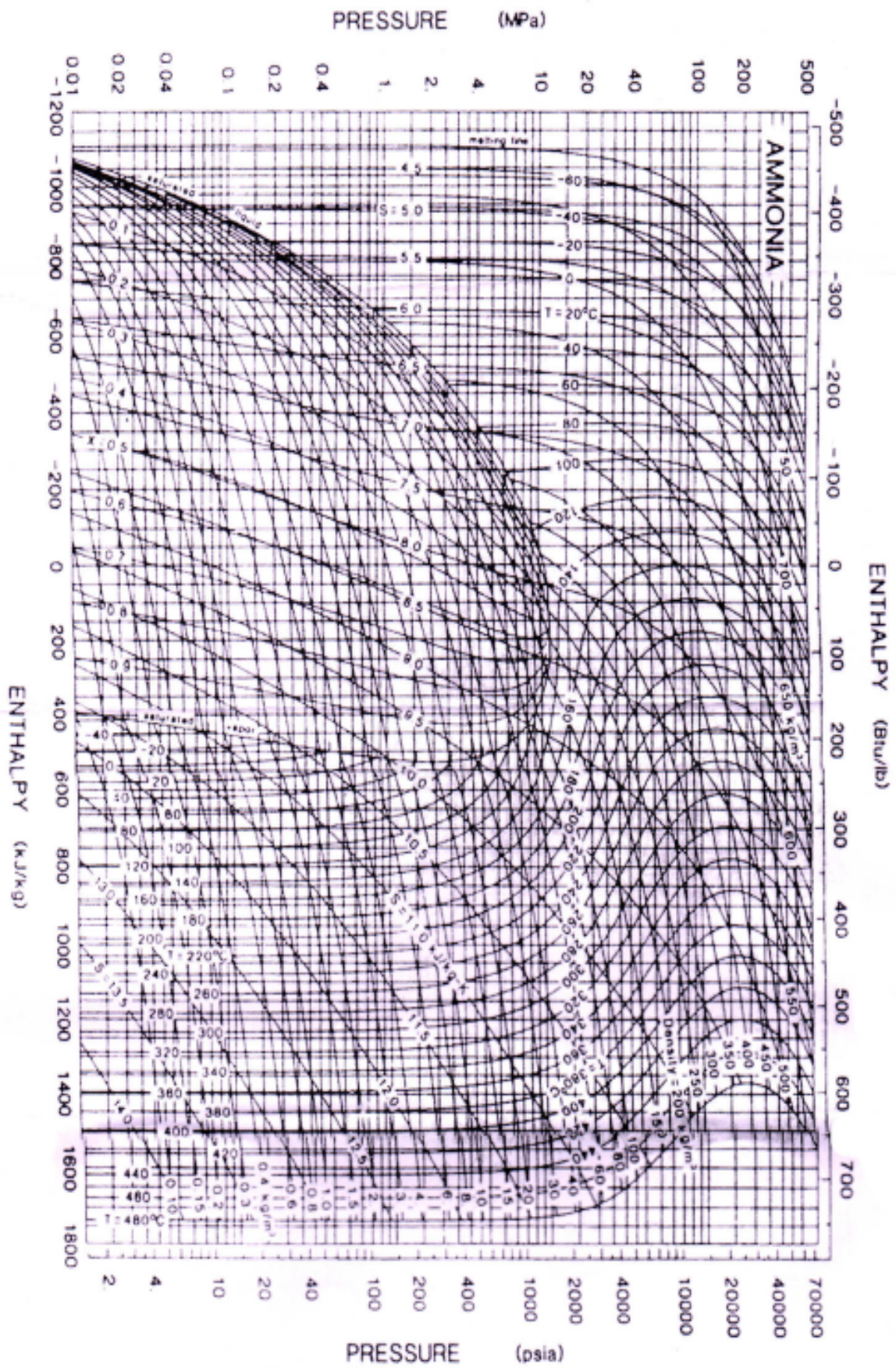
Blast freezer, IQF, Plate Freezer & Spiral freezer

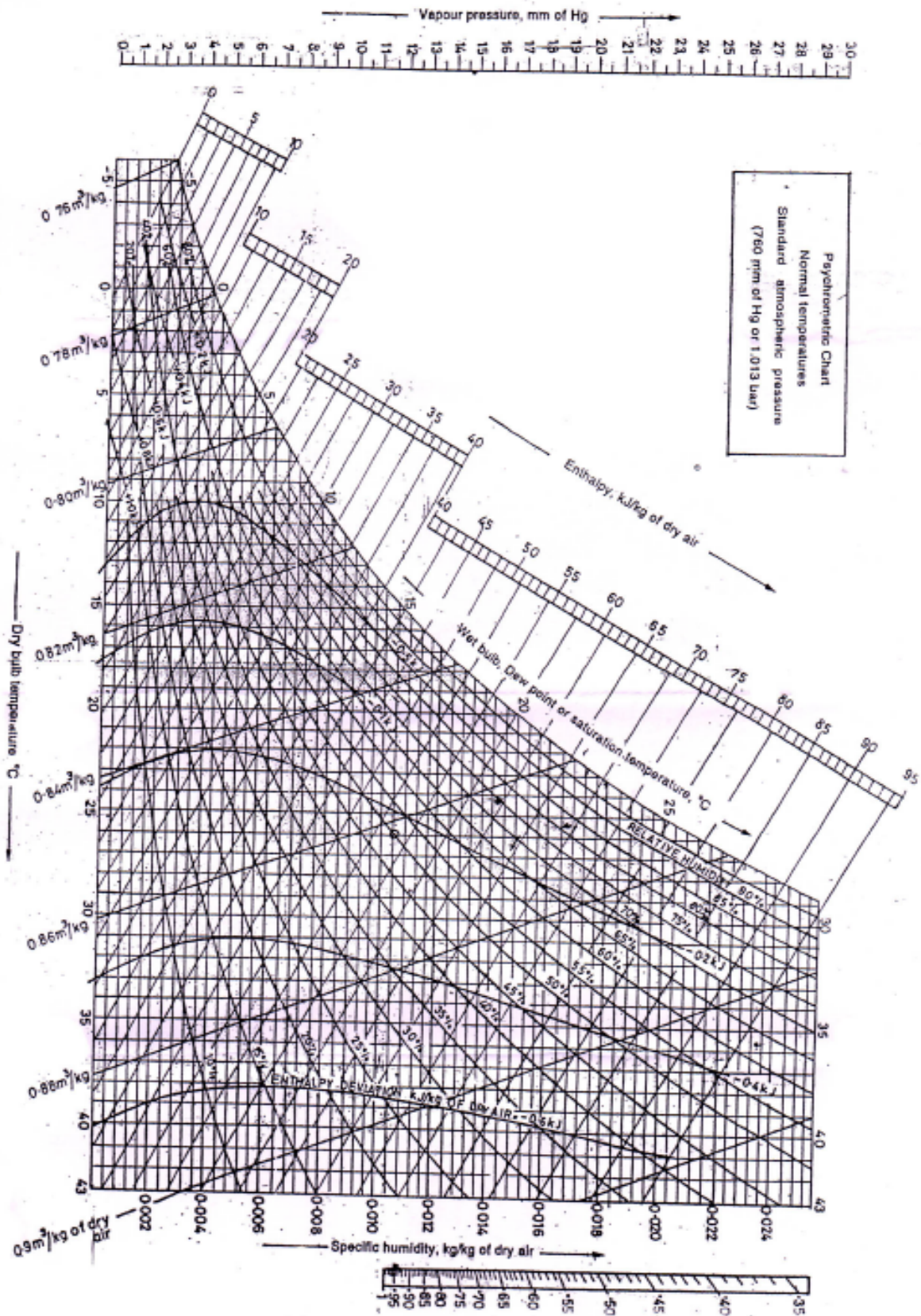
OR

Q12)a) Explain equal friction method of duct design with suitable example. **[8]**

b) Explain various dynamic losses in ducts. How these losses are calculated?

[8]





Total No. of Questions : 12]

SEAT No. :

P4016

[Total No. of Pages : 3

[5353]-20

T.E. (Computer Engineering) (Semester - II)

FINANCE AND MANAGEMENT INFORMATION SYSTEMS

(2008 Pattern) (Theory)

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

UNIT - I

- Q1)** a) Enlist functions of manager & explain? What are responsibilities of manager? [8]
- b) Define Management .What are different levels of management? Explain in detail. [8]

OR

- Q2)** a) Define term quality? Explain total quality management. [8]
- b) What is meant by international management? Explain cultural differences in international management. [8]

UNIT - II

- Q3)** a) What is mean by shares & debentures? Explain different types of shares. [8]
- b) What is mean by capital? Enlist types of capitals & explain in details. [8]

OR

- Q4)** a) Enlist Financial Statements & explain each with suitable example? [8]
- b) Define Financial Management. Explain its goals and principles. [8]

P.T.O.

UNIT - III

- Q5)** a) What is DSS (Decision Support System)? Discuss application of DSS. [8]
b) Explain followings : [10]
i) Knowledge Management System.
ii) Business processing reengineering.

OR

- Q6)** a) What is the concept of Management information System? Explain in detail. [8]
b) Explain followings : [10]
i) Knowledge Management System.
ii) Role of Management information system in DSS.

SECTION - II

UNIT - IV

- Q7)** a) What is e-commerce? Explain different business model used in ecommerce. [8]
b) Explain the mode of payment making in e-commerce with suitable examples. [8]

OR

- Q8)** a) Describe the essential process for the successful operation & management of CRM. [8]
b) Describe the different tools of security management in e-commerce. [8]

UNIT - V

- Q9)** a) Explain Supply chain management (SCM)? Explain the benefits & challenges of SCM. [8]
b) What is Customer Relation Management? How does it support global businesses? [8]

OR

- Q10)** a) Describe the architecture of ERP system? Explain the benefits of ERP system. [8]
b) Explain cultural, political & geo-economic challenges involved in global IT management. [8]

UNIT - VI

- Q11***) a) Explain the importance of IT Act to stop the cyber-crime in e-business? [9]
b) Explain right to information act in detail. Is it beneficial for the society? [9]

OR

- Q12***) a) Explain patents, copyright, and trademarks in detail. [9]
b) Explain cyber crime and cyber laws in brief. What are the advantages of cyber laws? [9]



Total No. of Questions : 12]

SEAT No. :

P4017

[Total No. of Pages : 3

[5353]-21

T.E. (Computer Engineering)

SYSTEM PROGRAMMING & OPERATING SYSTEM

(2008 Pattern) (Theory)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Solve Q. 1 or 2, Q. 3 or 4, Q. 5 or Q. 6 from Section - I and Q.7 or 8, Q.9 or Q.10, Q. 11 or 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.*
- 5) *Answers to the two Sections should be written in separate books.*

SECTION - I

- Q1)** a) What are different databases that are used for design of PASS-1 of a two pass Assembler. Give the format for each one of these. [8]
- b) What is macro? When we should use macro? What are the advantages of macros. [8]

OR

- Q2)** a) Explain the concept of language processor. [8]
- b) What are the assembler directives? Explain with example. [8]

- Q3)** a) Explain overlay structure. What is dynamic binding? [8]
- b) Explain in brief compile and go scheme. What are advantages and disadvantages of this scheme. [8]

OR

- Q4)** a) Explain in brief a direct linking loader. [8]
- b) What is a loader? What are its basic functions? [4]
- c) Explain the term static linking and dynamic linking. [4]

P.T.O.

- Q5)** a) Explain Process state transition diagram. [6]
b) What is a thread? Explain difference between process and a thread. [6]
c) Explain the concept of multiprogramming and real time operating system. [6]

OR

- Q6)** a) Explain the contents of process control block. [6]
b) Explain following system calls. [6]
i) exec
ii) fork
iii) wait
c) What do you mean by preemption? Explain any 2 preemptive scheduling algorithms with example. [6]

SECTION - II

- Q7)** a) Define deadlock. What are methods for handling deadlock? Explain any one method in detail. [10]
b) Write a solution to reader writer problem using semaphores. [8]

OR

- Q8)** a) Explain the Producer consumer problem. Write a solution to problem using monitors. [10]
b) Explain types of message passing system used in interprocess communication. [8]

- Q9)** a) With proper examples explain memory allocation strategies first fit, best fit and worst fit. Also explain their advantages and disadvantages. [8]
b) What is paging? Explain the process of address translation in paging. [8]

OR

- Q10)** a) What is TLB? Explain the paging system with the use of TLB? What are the advantages of TLB. [8]
b) Explain page replacement algorithms with example. [8]

Q11)a) What is RAID? Explain RAID levels with their advantages and disadvantages. **[8]**

b) With respect to file system explain free space management. What are the techniques for free space management. Explain in Detail. **[8]**

OR

Q12)a) Explain in details File allocation methods with their advantages and disadvantages. **[8]**

b) Explain different disk scheduling algorithms with example. **[8]**



Total No. of Questions : 12]

SEAT No. :

P4018

[Total No. of Pages : 3

[5353]-22

T.E. (Information Technology) (Semester - II)

PROGRAMMING PARADIGMS

(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) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn whenever necessary.
- 4) Assume suitable data, if necessary.

SECTION - I

- Q1)** a) What is data object? What is life time of data object? Explain programmer and system defined data object. [10]
- b) Define term 'Binding'. Explain following classes of binding times. [8]
- i) Language implementation time.
 - ii) Translation Time
 - iii) Run Time

OR

- Q2)** a) State and explain the importance of learning programming languages. [10]
- b) State the key features of following programming paradigms. [8]
- i) Procedural
 - ii) Object oriented
 - iii) Logic
 - iv) Functional

- Q3)** a) Explain with example the content of Code segment and Activation record at run time. [8]
- b) Compare the programming language 'C' and PASCAL with respect to [8]
- i) Subprogram declaration
 - ii) Subprogram invocation
 - iii) Variable declaration
 - iv) Control loops

P.T.O.

OR

- Q4)** a) What do you mean by exception? Explain its use with example. [8]
b) Differentiate between subroutines and co-routine. Discuss their implementation. [8]

- Q5)** a) What is AWT? Explain Applet life cycle. [8]
b) Explain following variables supported by Java with example. [8]
i) Instance variable
ii) Static variable
iii) Local variable
iv) Parameter variable.

OR

- Q6)** a) Explain the concept of multithreading? Explain the same with respect to java with suitable example. [8]
b) Explain the following concept in Java. [8]
i) Panel
ii) Frame
iii) Canvas
iv) Container

SECTION - II

- Q7)** a) Explain backtracking in Prolog with suitable example. [8]
b) What is declarative programming paradigm ? How it is different than imperative paradigm? [6]
c) Explain rules, fact and queries in Prolog with example. [4]

OR

- Q8)** a) Write a short note on Lambda calculus. [5]
b) Write the mathematical properties of functional programming language. [5]
c) What is Unification and Resolution? Why these are important in Logic Programming? [8]

- Q9)** a) Describe three basic organizations used in the design of multiprocessor operating systems. [8]
b) What is meant by parallel programming? What are the design principles for parallel programming. [8]

OR

- Q10)** a) State the different Synchronization mechanisms of Parallel programming language. Explain any two. [8]
b) Enlist & explain the 8 socket primitives required for network connection. [8]

- Q11)** a) Explain design principles Data flow programming and note firing schemes used in data flow computation. [8]
b) Explain design principles of Network System. [8]

OR

- Q12)** Write a short note on : [16]
a) Flynn's classification
b) Parallel compiler
c) Internet Programming
d) Design principles of Database Programming



Total No. of Questions : 11]

SEAT No. :

P4019

[Total No. of Pages : 2

[5353]-23

T.E. (Information Technology)

HUMAN COMPUTER INTERACTION AND USABILITY

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer all questions.*
- 2) *Figures to the right indicate full marks.*

SECTION - I

Q1) a) How does a human brain solve problems? What is problem space theory? **[8]**

b) Discuss general principles and goals of user interface design. **[8]**

OR

Q2) a) Define Ergonomics. What are its applications in software design? **[8]**

b) What is interaction design? Explain any one model of interaction design. **[8]**

Q3) a) Discuss how social environment influences the interactions with the computer? What effect does the organization (commercial or academic) to which you belong have on the interaction? **[10]**

b) Describe any four interaction styles. **[8]**

OR

Q4) a) What are the characteristics of interaction design process? What are the basic activities of interaction design? **[10]**

b) Describe the human factors essential to be considered for designing an online shopping portal. **[8]**

Q5) a) Explain with examples the concept of “Design for Diversity”. **[8]**

b) Evaluate Microsoft Word interface using the “Eight golden rules of interface design”. **[8]**

P.T.O.

OR

- Q6)** a) Why do we need to create prototypes? What are different prototyping methods? [8]
b) How will you apply the usability engineering process for designing an online library management system? [8]

SECTION - II

- Q7)** a) What is DECIDE? List and explain unique phases of DECIDE framework. [8]
b) Discuss usability standards and guidelines for website development. [8]

OR

- Q8)** a) Discuss the characteristics, guidelines and principles of good web page design. [8]
b) What are different user-interface evaluation paradigms? [8]

- Q9)** a) Describe in details the task (and subtasks) while purchasing a product online with the help of a hierarchical task analysis diagram. [8]
b) Give any two diagrammatic or textual notations used to design dialogs in effective user interface. Justify your notations with respective examples. [8]

OR

- Q10)** a) Explain the status event analysis method of modeling rich interactions. [8]
b) What is Dialog? Explain any two diagrammatic dialog design notations. [8]

Q11) Write short notes on any three : [18]

- a) Human aspects in designing groupware systems
- b) Ubiquitous Computing
- c) Methods of information visualization
- d) Applications of Augmented Reality



Total No. of Questions : 12]

SEAT No. :

P4020

[Total No. of Pages : 5

[5353]-25

T.E. (Petroleum Engineering)
NATURAL GAS ENGINEERING
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer Q. No.1 or 2, Q. No. 3 or 4, Q. No. 5 or 6 from section-I and Q. No. 7 or 8, Q. No. 9 or 10, Q. No. 11 or 12 from section-II.*
- 2) *Answers to the two sections must be written in separate answer book.*
- 3) *Figures to the right indicates full marks.*
- 4) *Neat diagram should be drawn wherever necessary.*
- 5) *Use a non programmable calculator.*
- 6) *Assume suitable data if necessary and clearly state it.*

SECTION - I

- Q1)** a) Explain the relevance of z-factor in natural gas engineering. [6]
b) What do you mean by critical pressure and temperature? Explain. [5]
c) Calculate the reserves in a gas field of 1600 acres , with 20ft sand thickness, 18% porosity, 15%water saturation, BHP = 2000 Psi gauge, BHT= 200 F. The natural gas has the following weight composition: $C_1 = 0.85$, $C_2 = 0.05$, $N_2 = 0.1$. [7]

OR

- Q2)** a) Find viscosity, molecular weight, specific gravity, pseudocritical properties, Z factor, Bg. Gas data: P_{ci} , T_{ci} are: 668,708,493 psia; 343, 520, 227R. ω_i and μ_i are 0.01,0.09,0.04 and 0.001,0.002,0.0015cp respectively. [13]
b) How are computations handled in natural gas engineering, when impurities are present? [5]
- Q3)** a) Why is gas flow in porous media different from liquid flow? [4]
b) Explain the process of gas flow metering. [8]
c) Explain difference between isochronal and modified isochronal testing. [4]

P.T.O.

OR

- Q4)** a) Write a short note on pseudo-pressure, and its importance in gas well testing. [8]
- b) A 50-in \times 100 Ib gauge has a differential pressure range of $R_h = 50$ inches and static pressure range of $R_p = 100$ psi. If a square root chart shows a reading of 7.2 for differential pressure and 9.4 for static pressure, calculate differential pressure and static pressure. [4]
- c) Write short notes on square root charts. [4]

- Q5)** a) For a well with a following parameter; $D = 7000$ ft, gas gravity is 0.7, $P_{ts} = 2300$ Psia, and average temperature of the flow string is 117 F. Gas flow rate = 10 MMscfd, $D_{ia} = 2$ inches $T_{wf} = 160$ F, $T_{tf} = 83$ F, $P_{tf} = 2122$ psia, length of tubing = 5700 ft, well is vertical. State your assumed values clearly and only do one iteration to find the flowing bottom hole pressure, static bottom hole pressure and temperature. $T_{pc} = 358$ R, $P_{pe} = 672$ psia, $f = 0.015$, $z = 0.79$. [8]
- b) Explain tubing pressure transverse with figure? [4]
- c) Explain the various flow regimes in multi-phase flow. [4]

OR

- Q6)** a) What do you mean by sonic flow? What is the difference between this and sub-sonic flow? [4]
- b) Write short notes on temperature at choke. [4]
- c) A 0.65 specific gravity gas flows from a 1.5-in pipe through a 1-in orifice-type choke. The upstream pressure and temperature are 850 psia and 75 F, respectively. The downstream pressure is 200 psia (measured 2 ft from the orifice). The gas-specific heat ratio is 1.3.
- i) What is the expected daily flow rate?
- ii) Does heating need to be applied to assure that the frost does not clog the orifice?
- iii) What is the expected pressure at the orifice outlet?
- $C = 0.62$, assume NRe is very high, $\mu = 0.01245$ [8]

SECTION - II

- Q7)** a) What is the criterion for choosing a CO₂ removal process? [8]
b) Write short note on horizontal and vertical separator? [4]
c) What do you mean by Alkanolamine process? Explain. [4]

OR

- Q8)** a) Draw the process diagram for glycol dehydration and explain the design considerations. [6]
b) Explain selection and working of spherical separator with a neat sketch? [6]
c) Explain amine sweetening process with a neat process flow diagram? [6]

- Q9)** a) Explain in detail two stage compressor cycle. [4]
b) Explain in detail, a centrifugal compressor. [4]
b) What is the HP required in compressing 1 MMSCFD from 100 psia and 80 F to 1600 psia using adiabatic equation? The gas is cooled to 80 F between stages. What is the discharge temperature of the gas? $k = 1.28$, gas gravity = 0.6, Z at 400 and 1600 psia are 0.985, 0.94 respectively. [8]

OR

- Q10)** a) Find the horsepower required with and without intercooling when compressing 16,000 cfm of natural gas, $k = 1.28$, measured at 60 F and 14.7 psia from atmospheric pressure of 14.4 to 125 psig. Inlet temperature is 70 F. Allow a 4% discharge at each stage. [7]
b) What is the difference between a reciprocating and centrifugal compressors? [3]
c) Write a note on Compressor selection. [3]
d) Explain the use of Mollier charts in compressor design. [3]

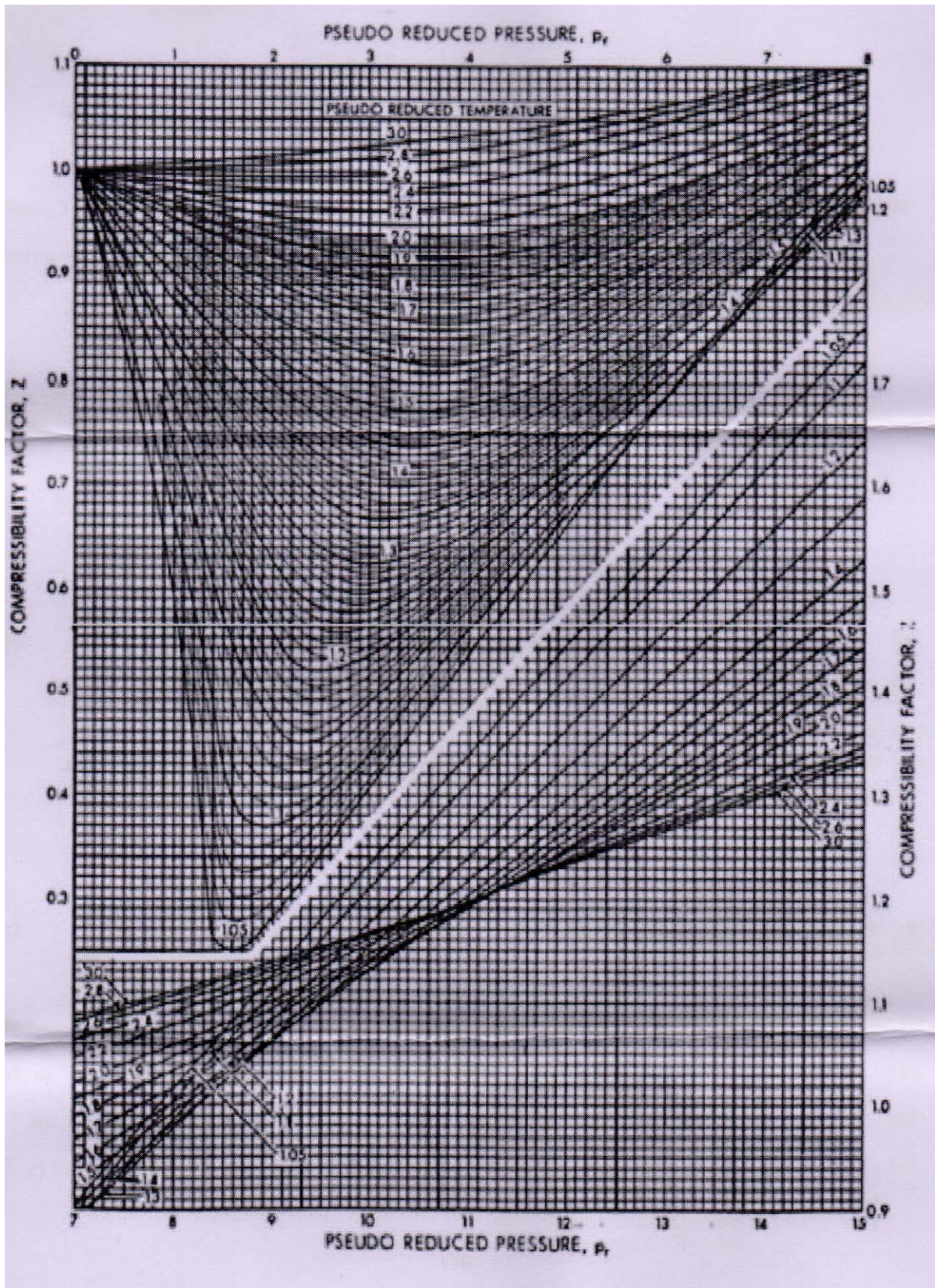
- Q11)** a) Calculate the gas flow rate in cubic ft / hr through a horizontal pipeline. Data given: $D = 12.09$, $L = 1000$ miles, $e = 0.0006$ in, $T = 80$ F, Specific gravity of gas = 0.7, $T_b = 520$ R, $P_b = 147$ psia, $P_1 = 600$ psia, $P_2 = 200$ psia, $f = 0.01223$, $Z = 0.9188$, $\mu = 0.0099$ cp. [6]
b) Explain effect of liquid loading in gas wells? [3]
c) Explain Turner's method in detail? [3]
d) Write short note on In-line inspection tools? [3]
e) Explain inspection and maintenance of natural gas pipeline? [3]

OR

- Q12)** a) Write short note on Pipeline efficiency? [3]
b) Write short note on Transmission factor? [3]
c) Give solutions for liquid loading problem? [3]
d) Write note on preventing hydrate formation? [3]
e) Write short note on pipeline cleaning and utility pigs? [3]
f) Write short note on pipeline economics? [3]



Compound	Chemical Composition	Symbol (for calculations)	Molecular Weight	Critical Pressure (psl)	Critical Temp. (R)
Methane	CH ₄	C ₁	16.04	673	344
Ethane	C ₂ H ₆	C ₂	30.07	709	550
Propane	C ₃ H ₈	C ₃	44.09	618	666
iso-Butane	C ₄ H ₁₀	i-C ₄	58.12	530	733
n- Butane	C ₄ H ₁₀	n-C ₄	58.12	551	766
iso-Pentane	C ₅ H ₁₂	i-C ₅	72.15	482	830
n-Pentane	C ₅ H ₁₂	n-C ₅	72.15	485	847
n-Hexane	C ₆ H ₁₄	n-C ₆	86.17	434	915
n-Heptane	C ₇ H ₁₆	n-C ₇	100.2	397	973
n-Octane	C ₈ H ₁₈	n-C ₈	114.2	361	1024
Nitrogen	N ₂	N ₂	28.02	492	227
Carbon Dioxide	CO ₂	CO ₂	44.01	1,072	548
Hydrogen Sulfide	H ₂ S	H ₂ S	34.08	1,306	673



Total No. of Questions : 6]

SEAT No. :

P1858

[5323]-40

[Total No. of Pages : 3

M.Sc. - II

ORGANIC CHEMISTRY

CH - 350 : Organic Reaction Mechanism

(2008 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Answers to the two sections should be written in separate answer books.*

SECTION - I

Q1) Write short notes on (any three) : **[12]**

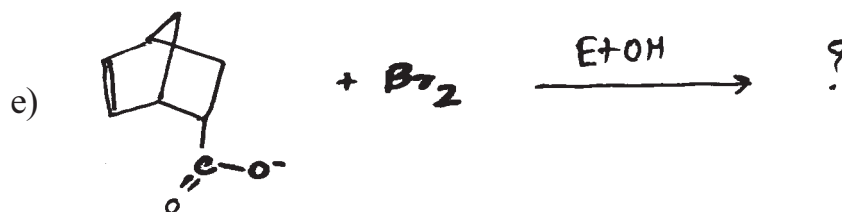
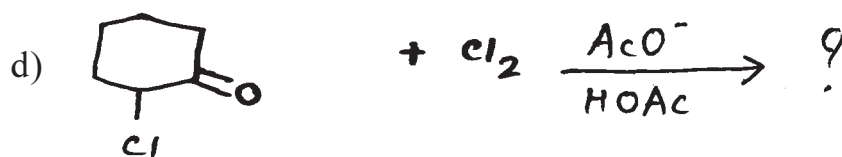
- a) Claisen ester condensation.
- b) Role of Pyridoxal phosphate in biotransformation.
- c) Curtius rearrangement.
- d) BAL1 and BAL2 mechanism.

Q2) Attempt any three of the following: **[12]**

- a) What is Hammett equation? What is physical significance of rho (ρ)?
- b) The $-\overset{\oplus}{\text{N}}\text{R}_3$ group has larger positive δ constant in the meta position than in the para position but it is reverse for $-\overset{\oplus}{\text{N}}_2$ group.
- c) Calculate how much faster p-chloroaniline is benzoylated at 25° then p-nitroaniline using the given data?
 $\rho = -2.78, \sigma_p - \text{Cl} = 0.23, \sigma_p - \text{nitro} = 0.78$
- d) Discuss the structure and methods for generation of nitrenes.

P.T.O.

Q3) Predict the product with mechanism of any four of the following: [16]

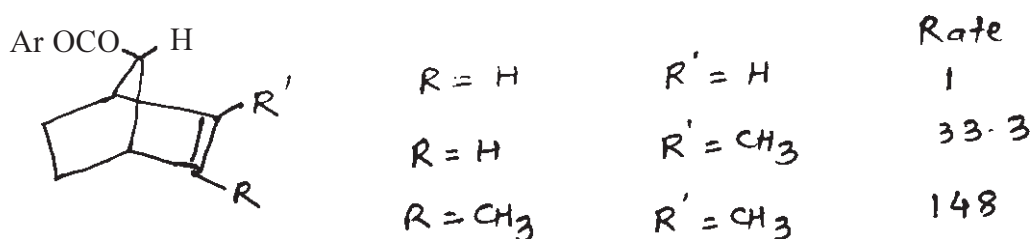


SECTION - II

Q4) Explain any three of the following: [12]

a) (n-Pr)₂CH-COOH is esterified more rapidly than i-Pr-CH₂-COOH.

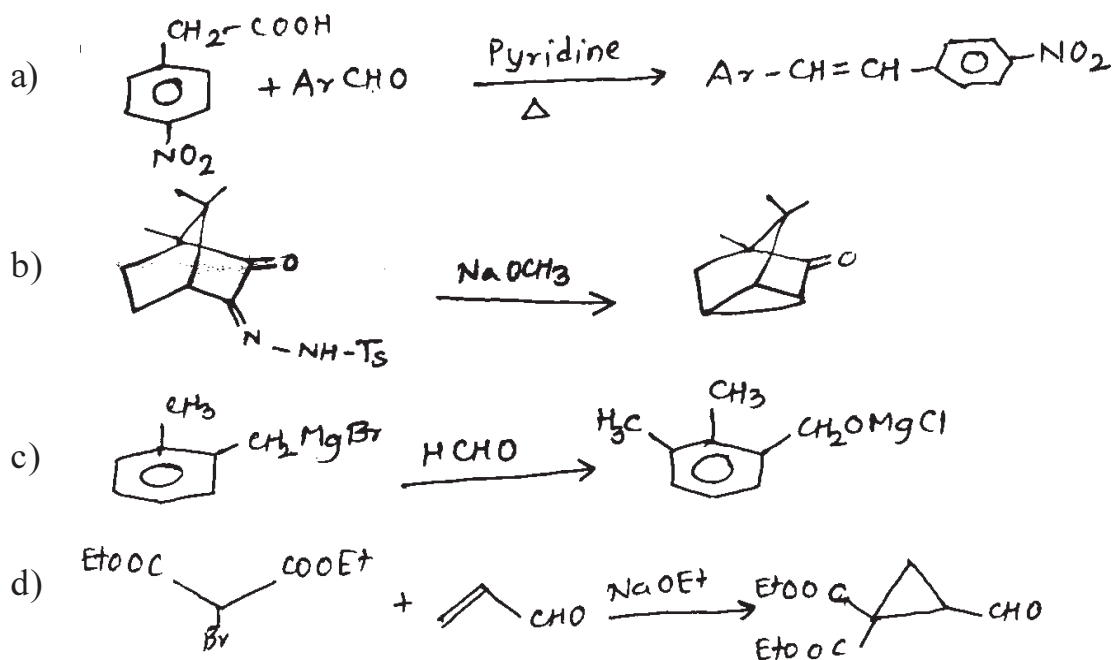
b) Explain the observed rates of solvolysis of the following compounds:



c) The decarboxylation of oxaloacetic acid has been found to be accelerated by Cu²⁺ ions.

d) Phenyl acetone on bromination in acidic and basic medium given same product.

Q5) Suggest the mechanism for the following conversion (any three): **[12]**



Q6) Attempt any four of the following: **[16]**

- Acetoxy acetone is weaker acid than acetyl acetone explain.
- The decarboxylation of β, γ - unsaturated carboxylic acid occurs readily at higher temperature.
- Brief account of kinetic isotopic effect.
- Mesitoic acid is reluctant to undergo esterification under ordinary condition but easily undergoes esterification when dissolved in Conc. H_2SO_4 followed by treatment with alcohol.
- Discuss any two methods of preparation of enamines, why they are selective in their reactivity.
- Explain the synthesis of Prephenic acid starting from Shikimic acid.



Total No. of Questions : 12]

SEAT No. :

P4002

[Total No. of Pages : 4

[5353]-5

T.E. (Mech., Mech. S/W)

TURBO MACHINES

(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

UNIT - I

- Q1) a)** A 75 mm diameter jet of water moving with a velocity of 25 m/s strikes a fixed inclined plate in such a way that the angle between the jet and the plate is 60° Find the **[8]**
- i) Area of jet and force exerted by the jet of water on the plate
 - ii) In the direction normal to the plate,
 - iii) In direction of jet and
 - iv) In the direction perpendicular to the jet direction
- b)** Obtain the expression for **[8]**
- i) Force
 - ii) Work done and
 - iii) Efficiency, for the case of force exerted by jet of water on the series of flat vanes

OR

- Q2) a)** Define the following terms with reference water turbines **[10]**
- i) Gross head
 - ii) Net head
 - iii) Hydraulic efficiency
 - iv) Mechanical efficiency
 - v) Jet ratio

P.T.O

- b) A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 rpm. The net head on the Pelton wheel is 700 m. The side clearance angle is 15° and discharge through nozzle is $0.1 \text{ m}^3/\text{s}$, Find [6]
- Water power available at the inlet of the nozzle and
 - Hydraulics efficiency of the turbine.

UNIT - II

- Q3)** a) A Francis turbine with an overall efficiency of 75 % is required to produce 148.25 kW power. It is working under a net head of 7.62m. The peripheral velocity is $0.26\sqrt{2gH}$ and the radial velocity of the flow at inlet is $0.96\sqrt{2gH}$. The wheel runs at 150 rpm and the hydraulic losses in the turbine are 22% of the available energy. Assuming radial discharge. Determine. [10]
- Guide blade angle
 - The wheel vane angle at the inlet
 - Diameter of the wheel at the inlet and
 - Width of the wheel at inlet
- b) What is draft tube? Discuss different types of the draft tube [6]

OR

- Q4)** a) A Kaplan turbine runner is to be designed to develop 9100kW. The net available head is 5.6m. If the speed ratio = 2.09, flow ratio = 0.68, overall efficiency = 86% and the diameter of the boss/hub is $1/3$ of the diameter of the runner. Find the diameter of the runner, its speed and the specific speed of the turbine. [8]
- b) Define the following terms, [8]
- Specific speed,
 - Unit head
 - Degree of reaction and
 - Flow ratio

UNIT - III

- Q5)** a) Write a classification of the steam turbines [6]
b) What is compounding? [2]
c) Steam enters the impulse wheel having a nozzle angle of 20° at a velocity of 450m/s. The exit angle of moving blades is 20° and relative velocity of the steam may be assumed to remain constant over the moving blades. If the blade speed is 180 m/s, Determine [10]
i) Blade inlet angle
ii) Work done per kg of steam
iii) Power developed when the steam mass flow rate is 1.8 kg/s and
iv) Diagram efficiency

OR

- Q6)** a) Discuss reheat factor [4]
b) Discuss different losses in the steam turbines [4]
c) Prove that the maximum efficiency of the reaction steam turbine is given by following expression [10]

$$\eta_{\max} = \frac{2 \cos^2 \alpha}{(1 + \cos^2 \alpha)}$$

SECTION - II

UNIT - IV

- Q7)** a) Discuss the reheating and regeneration with help of neat sketch. [8]
b) In a gas turbine plant air enters the compressor at 1 bar and 7°C . It is compressed to 4 bar with an isentropic efficiency of 82%. The maximum temperature at the inlet to the turbine is 800°C . The isentropic efficiency of the turbine is 85%. Calculate the following: [8]
i) Compressor work
ii) Heat supplied
iii) Turbine work and
iv) Net work. Assume $C_{p\text{air}} = 1.005 \text{ KJ/kgK}$, $C_{p\text{gas}} = 1.147 \text{ KJ/kgK}$,
 $\gamma_{\text{gas}} = 1.33$

OR

- Q8)** a) With neat sketch explain working of turboprop and pulsejet machines [10]
b) The effective jet exit velocity from a jet engine is 2700 m/s. the forward flight velocity is 1350 m/s and the air flow rate is 78.6 kg/s. Calculate [6]
i) Thrust,
ii) Thrust power and Propulsive efficiency.

UNIT - V

- Q9) a)** The outer diameter of an impeller of a centrifugal pump is 400mm and outlet width is 50mm. The pump is running at 800rpm and is working against a total head of 15m. The vanes angle at the outlet is 40° and Manometric efficiency is 75%. Determine [8]
- i) velocity of flow at outlet
 - ii) Velocity of the water leaving the vane
 - iii) Angle made by the absolute velocity at outlet with the direction of the motion at outlet and
 - iv) Discharge.
- b) What is principle of working of the centrifugal pump? Discuss the construction of the centrifugal pump with neat sketch. Discuss different types of impellers. [10]

OR

- Q10)a)** Show that the pressure rise in the impeller of the centrifugal pump when frictional and other losses in the impeller are neglected is given by

$$= \frac{1}{2g} [Vf_1^2 + u_2^2 + vf_2^2 \operatorname{cosec}^2 \phi]$$

Where Vf_1 and Vf_2 are flow velocities at inlet and outlet, u_2 is tangential velocity of the impeller at outlet and ϕ is vane angle at outlet [12]

- b) What is cavitation in the centrifugal pump? What are the causes of cavitation? Discuss remedies for it. [6]

UNIT - VI

- Q11)a)** Discuss the effect of outlet vane angle on performance of the centrifugal compressor. Mention following points in the discussion, [10]
- i) Draw different shapes of the vanes
 - ii) Write a basic equation
 - iii) Draw H - Q graph where H is head and Q is flow rate.
- b) Draw a neat sketch of centrifugal compressor and explain its working. [6]

OR

- Q12)a)** Write a difference between axial flow and centrifugal flow compressor [6]
- b) Discuss the following terms,
- i) Surging and
 - ii) Stalling in the compressors

[10]



[5353]-07

T.E. (Electronics) (Semester - I)
FEEDBACK CONTROL SYSTEM (304201)
(2008 Pattern)

Time : 3 Hours]

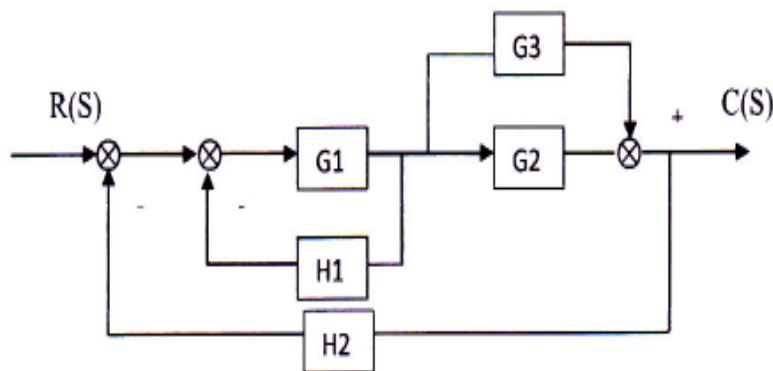
[Max. Marks : 100

Instructions to the candidates:

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

SECTION - I

- Q1)** a) Short note on open loop and closed loop system with advantage and disadvantage. [8]
- b) Reduce the following block diagram using block diagram algebra. Determine transfer function $C(S)/R(S)$ for given diagram. [8]

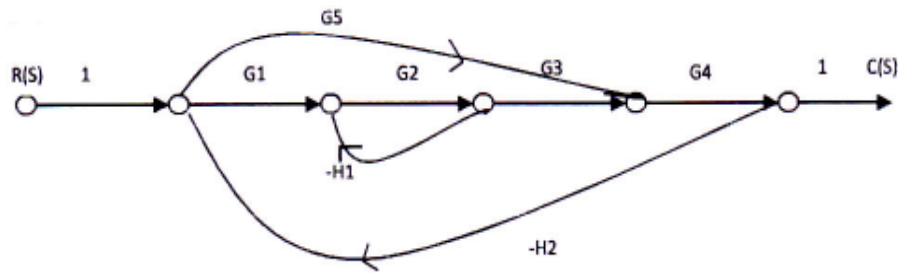


OR

- Q2)** a) Comparing between block diagram representation and signal flow graph. [8]

P.T.O

- b) Determine the ratio of $C(S)/R(S)$. Use Mason's gain formula for signal flow graph. [8]



- Q3) a) A unity feedback system has $G(s)H(s) = \frac{40(s+2)}{s(s+1)(s+4)}$ determine. [8]

- Type of system.
- All error coefficient
- Error for ramp input with magnitude 4.
- Final steady state error.

- b) A second order system is given by $\frac{C(S)}{R(S)} = \frac{25}{S^2 + 6S + 25}$ [8]

Find

- Rise time
- Peak time
- Peak overshoot.
- Settling time if subjected to unit step input. Also calculate expression for it's output response.

OR

- Q4) a) $s^6 + 4s^5 + 3s^4 - 16s^2 - 64s - 48 = 0$ check the stability of given characteristic equation using Routh's method. [8]

- b) Draw the root locus of following system and find stability. [8]

$$G(s)H(s) = \frac{k}{(s^2 + 2s + 2)}$$

Q5) a) Unit step input is applied to unity feedback control system with [8]

$$G(s) = \frac{k}{s(1+sT)}$$

Determine k and T to have overshoot 20%. $\omega_r = 6$ rad/sec. also calculate M_r

b) A unity feedback control system has [10]

$$G(s) = \frac{k(s+20)}{(s+1)(s+2)(s+10)}$$

Draw the bode plot for k = 10 and determine G.M, P.M., ω_{gc} , ω_{pc} and comment on stability.

OR

Q6) a) The open loop transfer function of a certain control system is [10]

$$G(s)H(s) = \frac{10}{s^2(s+2)}$$

Sketch the nyquist plot and comment on closed loop stability of system.

b) Classify compensation techniques and explain any one in detailed. [8]

SECTION - II

Q7) a) Evaluate the controllability of the system by Gilbert's test [8]

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U(t)$$

b) Find state transition matrix for, the system expressed as [8]

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

OR

Q8) a) Evaluate controllability and observability of following state model [8]

$$A = \begin{bmatrix} -2 & 1 \\ 1 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 1 \\ 0 \end{bmatrix} \quad C = [1 \quad -1]$$

b) Define the terms for second order system: [8]

- i) State
- ii) State variables
- iii) State space
- iv) State vector

Q9) a) Classify Electrical Transducer and explain any one [8]

b) State PI control mode and state characteristics. [10]

OR

Q10)a) What is ladder diagram? Explain concept with example in detail. [10]

b) Explain architecture of PLC. [8]

Q11)a) Explain architecture of fuzzy controller. [8]

b) What is biological neuron? Explain it's construction and corresponding mathematical model. [8]

OR

Q12)a) Explain fuzzy set and membership function. [8]

b) Explain various types of neural network. [8]



Total No. of Questions : 12]

SEAT No. :

P4004

[Total No. of Pages : 3

[5353]-8

T.E. (Electronics)

MICROCONTROLLERS

(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.*
- 2) *Attempt 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) *Neat diagrams must be drawn whenever necessary.*
- 5) *Assume suitable data, if necessary.*

SECTION - I

- Q1)** a) Compare Microprocessor and Microcontroller with respect to general architecture and features with example [8]
- b) Explain internal structure of port 0 of 8051? Explain the role pull up resistor [8]

OR

- Q2)** a) Explain the various performance measurement of microcontroller [8]
- b) Compare the Von Newman and Harvard architecture [8]

- Q3)** a) Assume that ROM space starting at 200H contain "University", write an algorithm and assembly language program to transfer the byte in to RAM location at 40H [8]
- b) Describe the addressing modes of 8051 microcontroller with example [8]

OR

P.T.O

- Q4)** a) List the SFRs associated with the following functions, find out their addresses and their contents after reset: [8]
- i) Timer/Counter
 - ii) I/O Ports
 - iii) Interrupts
 - iv) serial communication
- b) Assume that the on-chip has a message "Pune University". Write a program to copy it from code space in to the upper memory space starting at address 80H. Also, as you place a byte in upper RAM, give a copy to P0. [8]

- Q5)** a) Draw an interfacing diagram to interface 16×2 LCD with 8051 microcontroller and write an assembly language program to display the message 'UNIVERSITY' [10]
- b) Draw an interfacing diagram to interface stepper motor through ULN2003 driver to 8051 microcontroller. Explain Full step mode and Half step mode of stepper motor. [8]

OR

- Q6)** a) Draw an interfacing diagram of DAC 0808 with 8051 microcontroller and write an assembly language program for generating sine waveform.[9]
- b) Draw an interfacing diagram for interfacing ADC 0804 with 8051 microcontroller and state the features of ADC 0804. [9]

SECTION - II

- Q7)** a) Compare RS485 Vs. RS232. Why MAX232 Chip is required in serial Communication [8]
- b) Write an ALP to transfer serially 'PUNE' continuously with baud rate 9600. Explain how to calculate Baud rate. [10]
- OR
- Q8)** a) Write short note on SPI protocol with suitable diagram. [8]
- b) Explain all the conditions of I2C protocol using timing diagram [10]

- Q9) a)** Explain the W register in the PIC Microcontroller with suitable example [6]
b) Explain the memory organization in PIC Controller. [10]

OR

- Q10)a)** Draw and explain architecture of ATMEGA 32. [10]
b) Draw and explain status register of PIC microcontroller. [6]

- Q11)a)** Design an 8051 based system to monitor and control the temperature of room to 50°C. System will take the input from sensor PT100. [16]

- Design suitable signal conditioning circuitry.
- Draw complete interfacing diagram using suitable ADC.

Draw the flowchart and write the program in assembly or in C language which includes initialization and peripherals.

OR

- Q12)a)** Design microcontroller based path follower. [10]
b) Explain how the speed of the DC motor controlled by PWM. [6]



Total No. of Questions : 12]

SEAT No. :

P4005

[Total No. of Pages : 3

[5353]-9

T.E. (Electronics)
DRIVES AND CONTROL
(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) *Answers to the two sections should be written in separate book.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Assume Suitable data if necessary.*
- 6) *Use of nonprogrammable Electronic pocket calculator is allowed.*

SECTION - I

- Q1)** a) Draw and explain the operation of single phase full converter drive feeding a separately excited dc motor. Explain with typical waveforms, the operation in continuous and discontinuous armature current modes. [8]
- b) Explain any two power factor improvement techniques for single phase converters. [10]

OR

- Q2)** a) What are DC motor performance parameters? Explain in brief [6]
- b) Explain with circuit diagrams the operation of single phase dual converter fed drive for a separately excited DC motor. [6]
- c) Compare chopper fed and Converter fed DC drives? Also explain how to select a power electronics converter for a DC motors drive [6]
- Q3)** a) Explain the operation of a closed loop DC motor drive. Also explain closed loop control of DC drives with Transfer function. [8]
- b) What is the need of breaking? Explain in detail dynamic and regenerative breaking for DC machines. [8]

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OR

- Q4)** a) Explain in brief with block diagram PLL based speed control of a DC motor. State the advantages of this control. [8]
- b) What are the advantages of Microprocessor based drives? With the help a neat block diagram, explain the operation of Microcontroller based DC drive. [8]
- Q5)** a) What are the different speed control techniques of a three phase Induction motor? Explain the significance of V/f control for 3 phase Induction motor. Explain the requirements of a 3 phase induction motor drive. [8]
- b) With the help of diagram explain use of CSI for speed control of three phase induction motor. [8]

OR

- Q6)** a) Explain in detail different methods of Breaking for three phase induction motor. [8]
- b) State and explain various schemes for induction motor speed control by voltage source inverters. [8]

SECTION - II

- Q7)** Write Short notes on [18]
- a) Salient pole motor Drive
- b) Cylindrical rotor motor Drive
- c) Synchronous Reluctance motor drive

OR

- Q8)** a) Compare Salient pole motor and Permanent magnet motor. [6]
- b) Draw and explain block diagram of a self controlled synchronous motor fed from a three phase inverter. [6]
- c) Explain drive requirements of AC drive. Also explain selection criteria of power converter for AC drive. [6]

- Q9) a)** With the help of a neat circuit diagram and waveforms explain the operation of three phase brushless dc motor drive. Also explain related waveforms. [8]
- b) Mention various types of stepper motors. Explain the operation of any one stepper motor driver circuit. Enlist the applications of Stepper motors. [8]

OR

- Q10)a)** Explain the operation of Switched Reluctance motor motor. Also list the advantages of SRM that has spark interest in its use as adjustable speed drive. [8]
- b) With the help of a neat circuit diagram and waveforms explain the operation of three phase brushless ac motor drive. State the applications of three phase brushless ac motor drive [8]

- Q11)a)** Explain PI control tuning of a drive in detail. [8]
- b) Explain the operation of neural network based PWM controller. [8]

OR

- Q12)a)** What is Neuro fuzzy system? Explain Adaptive network based Fuzzy Interface System. [8]
- b) Enlist different applications of neural network in drives and control. Explain the operation of Fuzzy logic based Induction motor drive. [8]

