Total No. of Questions : 12]

SEAT No. :

P3087

[Total No. of Pages : 2

[4660] - 1286

M.E. (Computer Networks)

SYSTEM OPERATIONS AND MAINTENANCE

(2013 Credit Pattern) (Semester - III) (610202)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt Q.No.1 or 2, Q.No. 3 or 4, Q. No. 5 or 6, Q.7 or 8., Q.9 or 10., Q.11 or 12.***
2) ***Figure to the right indicates full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

Q1) a) What is microkernel? Explain microkernel based operating system. **[5]**

b) Compare synchronous versus asynchronous inter process communication. **[4]**

OR

Q2) a) What is group service protocol? List characteristics of GSP communication. **[5]**

b) Explain components of IOS XR Layered High Availability Architecture. **[4]**

Q3) a) Compare Control plane and data plane configuration management. **[4]**

b) List and explain functionalities of Cisco IOS XR Configuration Manager. **[4]**

OR

Q4) a) Explain details of configuration commit and configuration rollback. **[4]**

b) What is two stage configuration model? Explain with suitable example.**[4]**

P.T.O.

Q5) What is SNMP? Which different versions of SNMP those are supported Cisco IOS XR software? Also explain basic steps are needed to configure SNMP on an IOS XR router. **[8]**

OR

Q6) What is role of Access Control Lists in forwarding plane? Give key features of Access Control Lists. **[8]**

Q7) What are the types of Interior routing protocol? Explain RIP in Detail. **[8]**

OR

Q8) What is OSPF? Which are significant roles of OSPF router? **[8]**

Q9) What are basic requirements of multicast forwarding? **[8]**

Differentiate between IGMPv2 and IGMPv3.

OR

Q10) Explain following MPLS Label Operations: Push, Pop, De-aggregate, Swap and push. **[8]**

Q11) Explain Functionalities of Three-Stage Fabric Links. **[9]**

OR

Q12) Explain Multimodule Configuration in IOS XR 3.5. **[9]**

☼ ☼ ☼

Total No. of Questions :8]

SEAT No. :

P3366

[Total No. of Pages :3

[4660]-1288

M.E. (Chemical)

MATHEMATICAL AND STATISTICAL METHODS

(2013 Credit Pattern) (Theory) (Semester - I) (509101)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer total 5 questions from following.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Obtain the solution of the differential equation in terms of Bessel function $x^2y'' - xy' + x^2y=0$. **[5]**

b) Express $f(x)=x^3 + 2x^2-x-3$ in terms of Legendre polynomials. **[3]**

c) Solve in series the equation $\frac{d^2y}{dx^2} + xy = 0$. **[2]**

Q2) a) Solve the differential equation $u_t = ku_{xx}$ such that **[5]**

i) u is not infinite when $t \to +\infty$.

ii) $ux=0$ when $x=0$ and u=0 when $x=1$ for all values of t.

iii) $u=u_0$ when $t=0$ for all values of x between 0 and 1.

b) Write a note on heat equation. **[3]**

c) Solve the equation by the method of separation of variables $py^3 + qx^2=0$. **[2]**

Q3) a) Expand the function in Laurent series 1-cos z /z^3 about z = 0. **[5]**

b) Find Taylor's expansion of (z–1)(z+1) about the point z = 1. **[3]**

c) Write a note on complex function. **[2]**

P.T.O.

Q4) a) In a bolt factory, machines A, B and C produce 25, 35 and 40% of the total output, respectively. Of a bolt is chosen at random from the combined output, what is the probability that it is defective? If a bolt chosen at random is found to be defective, what is the probability that it was produced by B or C? **[5]**

b) A random variable X has the following probability distribution **[3]**

x:	-2	-1	0	1	2	3
p(x):	0.1	K	0.2	2K	0.3	3K

i) Find K

ii) Calculate mean and variance.

c) Write a note on - mean and variance Distribution. **[2]**

Q5) a) Compute the coefficient of correlation between X and Y using the following data: **[5]**

X :	78	89	97	69	59	79	68	57
Y :	125	137	156	112	107	138	123	108

b) Find the rank correlation for the following data: **[3]**

x :	3	8	9	2	7	10	4	6	1	5
y :	5	9	10	1	8	7	3	4	2	6

c) The regression equations of two variables x and y are x=0. 7y+5.2, y=0.3x+2.8. Find the means of the variables. **[2]**

Q6) a) The following data resulted from an experiment to compare three burners B_1B_2 and B_3. A Latin square design was used as the tests were made on 3 engines and were spread over 3 days. [$F_{5\%}$ (v_1=2, v_2=2) = 19] **[5]**

	Engine 1	Engine 2	Engine 3
Day 1	B_1-16	B_2-17	B_3-20
Day 2	B_2-16	B_3-21	B_1-15
Day 3	B_3-15	B_1-12	B_2-13

Test the hypothesis that there is no difference between the burners.

b) Name the basic principles of experimental design. **[3]**

c) Compare RBD and LSD. **[2]**

Q7) a) In a random sample size 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the samples have been drawn from the same population with SD4? (LOS = 1%, $Z\alpha = 2.58$) **[5]**

b) In a large city A, 20% of a random sample of 900 school boys had a slight physical defect. In another large city B, 18.5 percent of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant? (LOS = 5%, $Z\alpha = 1.96$). **[5]**

Q8) a) The regression equations of two variables x and y are 7x -16y+9=0, 5y–4x-3=0. Find the coefficient of correlation between them. **[5]**

b) Fit a second degree parabola to the following data: **[5]**

x :	1	2	3	4	5	6	7	8	9
y :	2	6	7	8	10	11	11	10	9

EEE

Total No. of Questions : 8]

SEAT No. :

P3367

[Total No. of Pages : 2

[4660]-1290

M.E. (Chemical)

ADVANCED SEPARATION PROCESSES

(509103) (2013 Credit Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any 5 questions.***
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, and electronic pocket calculator and steam table is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What are non conventional separation processes? **[4]**

b) Discuss the recent advances in separation techniques based on size. **[3]**

c) What is cross flow electro filtration? **[3]**

Q2) a) Explain Surface based solid - liquid separations. **[4]**

b) Write about the equipment used in cross flow filtration. **[3]**

c) What is reverse Osmosis? **[3]**

Q3) a) Explain the Design aspects of Nanofiltration. **[4]**

b) Discuss Ultrafiltration. **[3]**

c) What is Donan Dialysis? **[3]**

Q4) a) Explain adsorption. **[4]**

b) Explain Freundlich Isotherm in detail. **[3]**

c) How to select the adsorbents? **[3]**

P.T.O.

Q5) a) What is ionic separations? **[4]**

b) What is electrophoresis? **[3]**

c) Explain Ion Exchange Chromatography. **[3]**

Q6) a) Explain HPLC. **[4]**

b) Explain HPTLC technique. **[3]**

c) Explain microwave assisted extraction. **[3]**

Q7) a) Discuss Reactive absorption for removal of hazardous gases like H_2S. **[5]**

b) Discuss economics of separation. **[5]**

Q8) a) Explain industrial effluent treatment by modern technique. **[5]**

b) What is Foam separation technique? **[5]**

Total No. of Questions : 8]

SEAT No. :

P3232

[Total No. of Pages : 2

[4660]-1291
M.E. (Chemical)
RESEARCH METHODOLOGY
(509104) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) What do you mean by research? Explain its significance in modern times. **[5]**

b) Distinguish between Research methods and Research methodology. **[5]**

Q2) a) What are the criteria of good research? **[5]**

b) What is research problem? Give suitable examples to elucidate your points. **[5]**

Q3) a) Compute the coefficient of correlation between X and Y using the following data: **[8]**

X:	1	3	5	7	8	10
Y:	8	12	15	17	18	20

b) Explain the discrete probability distribution. **[2]**

Q4) a) It is predicted that the students will learn most effectively with a constant background sound, as opposed to an unpredictable sound or no sound at all. A group of 24 students is randomly divided into three groups of eight. All students study a passage of text for 30 minutes. Those in group 1 study with background sound at a constant volume in the background. Those in group 2 study with noise that changes volume periodically. Those in group3 study with no sound at all. After studying, all students take a 10 point multiple choice test over the material. Their scores are as follows. **[8]**

P.T.O.

Group	Test Scores							
1) Constant sound	7	4	6	8	6	6	2	9
2) Random sound	5	5	3	4	4	7	2	2
3) No sound	2	4	7	1	2	1	5	5

Set up a table of analysis of variance and calculate F.

b) What should be the contents of abstract of a report? **[2]**

Q5) a) Why tabulation is considered essential in a research study? Narrate the characteristics of a good table. **[5]**

b) Explain the terminology used in design of experiments. **[5]**

Q6) a) Write a short note on bibliography and its importance in context of research report. **[5]**

b) Write a note on Research hypothesis. **[5]**

Q7) a) Explain the scope of Patent Rights. **[5]**

b) Discuss the steps involved in preparing scientific and technical presentations. **[5]**

Q8) a) How is invention defined in the Indian Patent Act which can qualify for grant of a patent? **[5]**

b) Write a note on IPR. **[5]**

●●●●●

Total No. of Questions :8]

SEAT No. :

P3233

[Total No. of Pages :3

[4660]-1293
M.E. (Chemical)
ADVANCED TRANSPORT PHENOMENA
(2012 Course) (Theory) (Semester - II) (509107)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any 5 questions from 8 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of electronics calculator is allowed.***
4) ***Assume suitable data if necessary.***

Q1) a) A solid sphere of radius R is rotating slowly at a constant angular velocity Ω in a large body of quiescent fluid. Develop expressions for the pressure and velocity distributions in the fluid and for the torque T_2 required to maintain the motion. It is assumed that the sphere rotates sufficiently slowly that it is appropriate to use of creeping flow version of equation of motion, use spherical coordinates. **[6]**

b) Derive the equation for velocity for flow through the annulus using starting following equations: **[4]**

$$v_z = -\frac{(P_0 - P_L)R^2}{4\mu L}\left[\left(\frac{r}{R}\right)^2 - 2\lambda^2 ln\left(\frac{r}{R}\right) + C_2\right]$$

BC 1: r = kR, $v_z = 0$

BC 2: r =R, $v_z = 0$

Q2) a) Determine the temperature distribution in an incompressible liquid confined between two coaxial cylinders, the outer one of which is rotating at steady angular velocity Ω_0 and radius ratio K to be fairly small so that the curvature of the fluid streamlines must be taken into account. The temperatures of the inner and outer surfaces of the annular region are maintained at T_k and T_1 respectively, with $T_k \neq T_1$. Assume steady laminar flow and neglect the temperature dependence of the physical properties.**[6]**

b) Summarize all the steps required in obtaining the equation of change for the temperature. **[4]**

P.T.O.

Q3) a) Heat conduction is flowing through an annular wall of inside radius r_0 and outside radius r_1. The thermal conductivity varies linearly with temperature from k_0 at T_0 to k_1 to T_1. Develop an expression for the heat flow through the wall. **[6]**

b) Summarize all the steps required in obtaining the equation of change for the temperature. **[4]**

Q4) a) Obtain the equation of continuity for a multi-component mixture. Assume binary system with constant ρ^{DAB}, with constant C^{DAB} or with zero velocity. **[6]**

b) Explain boundary layer separation and formation of wakes. **[2]**

c) Explain effective thermal conductivity of composite solids. **[2]**

Q5) a) Define the heat transfer coefficient, the Nusselt number, the Stanton number, and the Chilton - Colburn j_H. How can each of these be 'decorated' to indicate the type of temperature - difference driving force that is being used? **[4]**

b) What is the physical significance of the fact that the turbulent Prandtl number is of the order of unity? **[2]**

c) What are the characteristic dimensionless groups that arise in the correlation for Nusselt numbers for forced convection? For free convection? For mixed convection? **[4]**

Q6) a) In a catalytic tubular reactor, a dilute solution of solute A in a solvent S is in fully developed laminar flow in the region $z<0$. When it encounters the catalytic wall in the region $0<z<L$, solute A is instantaneously and irreversible rearranged to an isomer B. Write diffusion equation appropriate for this problem and find the solution for short distances into the reactor. Assume that the flow is isothermal and neglect the presence of B. Use the following equations: **[5]**

$$v_z \frac{\partial C_A}{\partial z} = D_{AS}\left[\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial C_A}{\partial r}\right)+\frac{\partial^2 C_A}{\partial z^2}\right]$$

b) A semi-infinite body of liquid with constant density and viscosity is bounded by horizontal surface. Initially the fluid and the solid are at the rest. Then at time t=0, the solid surface is set in motion in the positive x direction with velocity v_0. Find the velocity v_x as a function of y and t. There is no pressure gradient or gravity force in the x direction and the flow is presumed to be laminar. **[5]**

Q7) a) Compare turbulent thermal conductivity and turbulent viscosity as to definition, order of magnitude, and dependence on physical properties of and nature of flow. **[3]**

b) One hundred kg per hour of oil at 100^{o}C are flowing through a 1 cm id copper tube, 20 m long. The inside surface of the tube is maintained at 215^{o}C by condensing steam on the outside surface. Fully developed flow may be assumed through the length of the tube, and the physical properties of the oil may be considered constant at the following values: density 55 kg/m^{3}, Cp = 0.49 KJ/kg^{0}C, viscosity = 1.42 kg/hr, k = 0.0825 KJ/ hr m^{o}C. Calculate Pr, Re, the exit temperature of the oil. **[3]**

c) Derive the equation of continuity for a multi-component mixture. **[4]**

Q8) a) Derive the expression for temperature distribution more than one independent variables. **[6]**

b) Estimate the maximum diameter of micro-spherical catalyst particles that could be lost in the stack gas of a fluid cracking unit under the following conditions:

Gas velocity at axis of stack = 1.0 m/s (vertically upward)

Gas Viscosity = 0.026 cp

Gas density = 0.045 kg/m^{3}

Density of catalyst particles = 1.2 g/cm^{3}

Express the results in microns? **[4]**

ɛɛɛ

Total No. of Questions : 8]

SEAT No. :

P3037

[Total No. of Pages : 3

[4660]-1294

M.E. (Chemical)

ADVANCED PROCESS CONTROL

(2013 Credit Pattern) (Semester-II) (509108)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Solve any 5 questions.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable date if necessary.***

Q1) a) What is process identification? **[2]**

b) State advantages of empirical modeling over theoretical modeling. **[3]**

c) Explain stages involved in empirical modeling of systems.(model formulation parameter estimation, model validation). **[5]**

Q2) a) Liquid having density ρ enters the tank having cross-section area A at flow rate Qi (cc/min) and temperature T_i (^oC) Tank is provided with steamheater which delivers heat to liquid inside the tank at the rate Q (kcal /hr). The liquid is continuously stirred by a stirrer which ensure uniform temperature distribution in liquid mass. Liquid leaves the tank at flow rate F (cc/s) and temperature T(^oC). Derive state equations which represent variation of level (h) and temperature (T) of liquid inside the tank using total mass and energy balance equations. State the assumptions made if any. **[5]**

b) Draw feedback control system for controlling temperature of liquid inside the tank by manipulating the flow rate of steam. Identify the state variables, output variables, disturbance, manipulated variables along with the parameters. **[3]**

c) Find number of degrees of freedom for this tank system. State how the degrees of freedom determine the control strategy? **[2]**

P.T.O.

Q3) a) A first-order process having gain 2 and time constant 3 min is controlled using PID- controller having tuning parameters k_c=1, T_I= 2 min,T_D= 1 min. Assuming G_m=G_f=1 draw block diagram of feedback control system. **[2]**

b) Derive servo and regulator transfer function for this system. Also find the characteristic equation for the system. **[3]**

c) Derive the expression for servo response of output for unit step change in set-point. Calculate final steady-state response and offset if any. Sketch the response curves. **[5]**

Q4) a) State the BIBO notion of stability for control system. Also state mathematical and graphical conditions for stability **[2]**

b) A feedback control system has open-loop transfer function **[8]**

$$G_H = \frac{K}{(S+2)\,(S+4)\,(S^2+6S+25)}$$

Applying Routh criterion, determine the values of K for which system is

i) Stable ii) Unstable iii) Marginally stable

Q5) a) Sketch root locus diagram for a feedback control system having open-loop transfer function $G_H = \frac{K}{S(S+4)\,(S^2+4S+20)}$. Show the break -away points and points of intersection of root locus with imaginary axis **[5]**

b) Sketch Bode plot for the control system having open-loop transfer function- $G_H = \frac{200(S+2)}{S(S^2+10S+100)}$. Determine gain and phase cross-over frequencies alongwith the gain and phase margins. Comment on stability of system. **[5]**

Q6) a) Sketch and explain cascade control system for controlling temperature inside the CSTR with jacket fluid temperature as secondary variable. **[5]**

b) Sketch and explain control system for controlling reflux ratio in distillation column. **[5]**

Q7) a) Explain RGA method for determination of interaction analysis and loop pairing of MIMO system. **[5]**

b) Explain conversion of discrete-time signal into original continuous- time signal using hold elements. **[5]**

Q8) a) Explain model predictive control strategy in detail. **[5]**

b) Explain interaction of plant design and control system design in plantwide control system. **[5]**

□□□

Total No. of Questions :8]

SEAT No. :

P3234

[Total No. of Pages :2

[4660]-1295

M.E. (Chemical)

ADVANCED REACTION ENGINEERING

(2013 Credit Pattern) (Theory) (Semester - II) (509109)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer total 5 questions from following.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Explain Langmuir-Hinshelwood model in details. **[5]**

b) What are the rate controlling steps in catalytic reactions? **[3]**

c) Write a note on catalytic reactions. **[2]**

Q2) a) A feed consisting 35% of 50 μm radius particles, 35% of 100 μm radius particles, 30% of 200 μm radius particles is to be reacted in a fluidized bed reactor (at a steady-state) from a vertical 2m long, 20 cm ID pipe. The time required for complete conversion is 5, 10 and 20 min for the three sizes of feed, find conversion of solids for a feed rate of 1 kg solids/min if bed contains 10 kg solids. **[5]**

b) Derive a model for spherical particle of unchanged size when chemical reaction is controlling resistance. **[3]**

c) For fluid particle reactions, derive expression for time of complete conversion for small particles in stokes regime. **[2]**

Q3) A reactor with a number of dividing baffles is to be used to run the reaction.

$A \rightarrow R$ with $-r_A = 0.05\ C_A$ mol/liter. Min

A pulse tracer test gives the following output curve:

Time, min	0	10	20	30	40	50	60	70
Concentration reading, mol/lit	35	38	40	40	39	37	36	35

P.T.O.

a) Calculate the variance of the E curve. **[5]**

b) Calculate X_A assuming plug flow. **[3]**

c) Calculate X_A assuming the tanks - in series model. **[2]**

Q4) a) From a pulse input into a vessel we obtain the following output signal

Time, min	1	3	5	7	9	11	13	15
Concentration, mol/lit	0	0	10	10	10	10	0	0

We want to represent the flow through the vessel with the tanks-in-series model. Determine the number of tanks to use. **[5]**

b) Explain Dispersion Model. **[3]**

c) Write a short note on Recycle Reactor Model. **[2]**

Q5) a) Derive expression for overall Effectiveness factor for a first order reaction carried out for a solid catalytic reaction? **[5]**

b) Derive the expression for gaseous diffusion in a cylindrical pore. **[3]**

c) Write a short note on Multiphase reactors? **[2]**

Q6) a) What is Weitz-prater criterion for internal diffusion? **[4]**

b) Write a short note on Internal vs External Diffusion? **[3]**

c) Explain the experimental method for finding rate in case of mixed reactor? **[3]**

Q7) a) What are the different surface reaction models? **[4]**

b) What is Enhancement factor? **[3]**

c) Discuss in brief about two phase fluidized bed model? **[3]**

Q8) a) Explain in brief about Slurry reactors? **[4]**

b) Discuss heat transfer coefficients in packed beds? **[3]**

c) Write a short note on fixed bed reactor? **[3]**

EEE

Total No. of Questions : 8]

SEAT No. :

P3368

[Total No. of Pages : 2

[4660] - 1297
M.E. (Chemical)
PROCESS MODELING & SIMULATION
(2013 Credit Pattern) (Semester - III) (509113)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any 5 questions.***
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.***

Q1) a) Define Model and Modeling. **[4]**

b) What is the use to develop a process model? Explain. **[3]**

c) Discuss modeling building procedure. **[3]**

Q2) a) What is linear and non linear model? Explain it with suitable example. **[4]**

b) What is energy equation and equation of motion? **[3]**

c) Write equation of state, phase and chemical equilibrium. **[3]**

Q3) a) What is degrees of Freedom? Explain with example. **[4]**

b) What is the key difference between independent variable and dependent variable? **[3]**

c) Explain Linear regression analysis. **[3]**

Q4) a) Explain any constrained optimization problems. **[4]**

b) Develop a model for single pipe exchanger. **[3]**

c) Explain Central factorial design. **[3]**

P.T.O.

Q5) a) Develop a model for differential distillation. **[4]**

b) Derive a model for binary distillation column. **[3]**

c) Write assumptions for a model of Batch reactor. **[3]**

Q6) a) What is simulation? Explain it with proper example. **[4]**

b) Write different process simulation software. **[3]**

c) Explain Chemcad in brief. **[3]**

Q7) a) Write note on Orthogonal collocation to solve PDEs. **[5]**

b) Explain method of weighted residuals. **[5]**

Q8) a) Explain Application Of Optimization pertaining to Chemical Reactor Design. **[5]**

b) Discuss constrained optimization problem. **[5]**

Total No. of Questions : 8]

SEAT No. :

P3422

[Total No. of Pages : 2

[4660] - 1298

M.E. (Chemical Engineering) (Semester - III)

Advanced Thermodynamics

(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Give relation between activity coefficients and excess functions. **[3]**

b) What are the Redlich-Kister equations? **[2]**

c) Derive the two suffix Margules Equation for the activity coefficient form excess functions for multicomponent mixtures. **[5]**

Q2) a) Give the phase rule and Duhem's theorem for reacting systems. **[2]**

b) What is reaction co-ordinate and give the relation between reaction co-ordinate and mole fraction for multiple reactions system? **[3]**

c) A feed stock of pure-n-butane is cracked at 750K and 1.2 bar to produce olefins. Only two reactions have favorable equilibrium conversions at these conditions.

$C_4H_{10} \rightarrow C_2H_4 + C_2H_6$ $\qquad$ $C_4H_{10} \rightarrow C_3H_6 + CH_4$

Give the expressions for mole fraction of the components and the expression for equilibrium constant in terms of mole fractions and pressure. If these reactions reach equilibrium, what is product composition? Take $K_1 = 3.856$, $K_{11} = 268.4$. **[5]**

P.T.O.

Q3) a) Write short note on Translation energy. **[3]**

b) Define the following terms. **[2]**

i) Assembly

ii) Canonical Assembly

iii) Occupational number

iv) Statistical weight factor

c) Calculate the number of ways of distribution four molecules in four energy levels so as there are 2 molecules in the level ε_0, 1 molecule in ε_1, 1 molecule in ε_2 energy level and zero in the ε_3 energy level. **[5]**

Q4) a) Write short note on evaluation of osmotic coefficient and activity coefficient from freezing point data. **[5]**

b) How is the activity in an electrolyte measured from vapor pressure. **[5]**

Q5) a) Write short note on the first and second order transitions with neat sketches of phase diagrams. **[5]**

b) Write a note on position disorder. **[5]**

Q6) a) Develop the expression for enthalpy and, Gibbs free energy on, thermodynamic properties of the surface. **[5]**

b) Develop the expression for equilibrium concentration of a system affected by centrifugal field. **[5]**

Q7) a) Explain the phenomena of entropy generation in irreversible thermodynamics. **[5]**

b) Write note on the Donder chemical affinity. **[5]**

Q8) a) Write the entropy balance for the non-equilibrium systems in terms of Gibbs energy for homogeneous open system. **[5]**

b) Derive the expression for first law of thermodynamics for open system assuming system behaves irreversibly. **[5]**

● ● ●

Total No. of Questions : 8]

SEAT No. :

P3038

[Total No. of Pages :2

[4660]-1300

M.E. (Environmental Engineering) (BOS-Chemical)

APPLIED STATISTICS FOR ENVIRONMENTAL ENGINEERS

(Semester-I) (2013 Credit Pattern) (509131)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
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.***

Q1) a) Find out the value of quartile deviation and its coefficient from the following data: **[4]**

Roll No.	1	2	3	4	5	6	7
Marks	20	28	40	12	30	15	50

b) State the differences between Mean deviation and Standard deviation. **[3]**

c) Explain the tests of skewness. **[3]**

Q2) a) Discuss the procedure for calculating the mean from ungrouped data. **[4]**

b) What is "Population standard deviation". **[3]**

c) Explain coefficient of variance. **[3]**

Q3) a) Discuss relation between moments about Mean in terms of Moments about any point. **[4]**

b) Find the covariance of the two random variables whose joint density is given by $f(x,y) = \begin{cases} 2 \text{ for } x>0, y>0, x+y<1 \\ 0 \text{ elsewhere} \end{cases}$ **[3]**

c) Explain Chebyshev's theorem to demonstrate how σ or σ^2 is indicative of the speed or dispersion. **[3]**

P.T.O.

Q4) a) Explain merits and limitations of R type factor analyses related to maximum likelihood method of factor analysis in detail. **[4]**

b) How the degrees of freedom are determined in chi-square distribution. **[3]**

c) What is Variance ratio test. **[3]**

Q5) a) Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal, against the alternative that they are not, at the 10% level.

[Assume that $P(F_{10,8} \geq 3.35) = 0.05$ and $P(F_{8,10} \geq 3.07) = 0.05$] **[4]**

b) Define the terms: **[3]**

i) Factorial experiment

ii) Precision

iii) Parameters

c) State the advantages of the completely randomized experimental design. **[3]**

Q6) a) State the steps in constructing Latin Square. **[4]**

b) Discuss the phases of experimental design. **[3]**

c) Distinguish between statistics and parameters. **[3]**

Q7) a) Explain graphical method for sequential sampling. **[5]**

b) Explain Transportation Algorithm. **[5]**

Q8) a) What is the function of the minimum ratio rule in the simplex method. **[5]**

b) Find the optimal assignment of four jobs and four machines when the cost of assignment is given by the following table: **[5]**

	J_1	J_2	J_3	J_4
M_1	10	9	8	7
M_2	3	4	5	6
M_3	2	1	1	2
M_4	4	3	5	6

□□□□

Total No. of Questions : 8]

SEAT No. :

P3370

[Total No. of Pages : 2

[4660]-1302

M.E. (Chemical) (Environmental)

ENVIRONMENTAL CHEMISTRY

(509133) (2013 Credit Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any 5 questions.***
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, and electronic pocket calculator and steam table is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain heavy metal precipitation. **[4]**

b) Explain environmental significance of coagulation. **[3]**

c) How the heavy metal precipitation takes place in environment? **[3]**

Q2) a) What are the different water quality parameters? **[4]**

b) What are the environmental significance total dissolved solids? **[3]**

c) Explain the method of determine the TDS. **[3]**

Q3) a) Explain the atmospheric structure of the earth. **[4]**

b) Discuss about sources of particulate matters. **[3]**

c) What are greenhouse gases? **[3]**

Q4) a) What is CO_2 Capturing? **[4]**

b) Explain Acid rain. **[3]**

c) What are the different Air quality parameters? **[3]**

P.T.O.

Q5) a) Explain the Fate of chemicals in aquatic environment. **[4]**

b) How to remove the Metals from wastewater by using adsorption? **[3]**

c) Explain Eh - pH diagrams. **[3]**

Q6) a) Explain chemical and photochemical reactions. **[4]**

b) Briefly explain Ozone layer depletion. **[3]**

c) What is particulate matter? Explain. **[3]**

Q7) a) Explain Atom economy. **[5]**

b) Environmental applications of Nano materials. **[5]**

Q8) a) Explain the ion-exchange reactions in soil. **[5]**

b) How to do the Reclamation of contaminated land? **[5]**

Total No. of Questions : 8]

SEAT No. :

P3371

[Total No. of Pages :2

[4660]-1303

M.E. (Chemical) (Environmental Engineering BOS)

RESEARCH METHODOLOGY

(Semester-I) (2013 Credit Pattern) (509134)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions:***
2) ***Figures to the right side indicate full marks.***
3) ***I llustrate your answers with suitable examples and diagrams, wherever necessary.***
4) ***Write relevant question number before writing the answer.***

Q1) a) What is research problem? Define the main issues which should receive the attention of the researcher in formulating the research problem. Give the suitable examples to elucidate your points. **[5]**

b) Explain the meaning of Research Methodology? Explain in brief its significance. **[5]**

Q2) a) Explain various steps in process of engineering research work. **[5]**

b) Distinguish between research methods and research methodology. **[5]**

Q3) a) How data analysis is done with help of computers? List and explain the softwares used in statistical analysis. **[5]**

b) What is importance of survey in research? How it is conducted? **[5]**

Q4) a) Discuss the types, characteristics and function of hypothesis in research. **[5]**

b) Examine the qualitative and quantitative research methods. **[5]**

Q5) a) Explain the significance of a research report and narrate the various steps involved in writing such reports. **[5]**

b) Empirical research in India in particulars creates so many problems for the researchers. State the problems that are usually faced by such researchers. **[5]**

P.T.O.

Q6) a) What are the different tools and techniques of data collection and analysis used in research? **[5]**

b) Explain the meaning of sampling design? Examine the various types of sampling design techniques. **[5]**

Q7) a) Explain the criteria of a good research problem? Examine the sources of research problem. Discuss with suitable example(s). **[5]**

b) Explain the characteristics of good research report. **[5]**

Q8) a) Write notes on (Any Two): **[5]**

i) Intellectual Property Rights (IPR)".

ii) Citation methods in research.

iii) Importance of Data interpretation in research.

iv) Ethical responsibilities of Researcher.

b) Explain about literature review why it is done? Discuss the various sources at literate review. **[5]**

□□□□

Total No. of Questions : 8]

SEAT No. :

P3039

[Total No. of Pages :2

[4660]-1305

M.E. (Chemical) (Environmental Engineering)

WASTEWATER TREATMENT & DESIGN

(2013 Credit Pattern) (Semester-II) (509137)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
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.***

Q1) a) Explain basic principle of mass transfer. **[4]**

b) Explain two film theory for gas liquid interface. **[3]**

c) State and explain, how sedimentation tanks are designed on the basis of surface loading rate (commonly termed overflow rate). **[3]**

Q2) a) Give the classification of filtration system. **[4]**

b) Discuss the design criteria for grannular medium filter. **[3]**

c) Explain back wash hydraulics. **[3]**

Q3) a) Explain TSA in the process of adsorption. **[4]**

b) What is breakthrough curve. **[3]**

c) Explain different types of isotherms in adsorption. **[3]**

Q4) a) Determine the design criteria for an activated sludge process to achieve essentially complete nitrification when treating domestic water. Assume that the following conditions apply for this example
Influent flow rate =0.90 Mgal /d (3400 m^3/d)
BOD after primary settling =200mg/L
TKN after primary settling =40mg/L
Minimum sustained temperature =15^oC
DO =2.5mg/L
Buffer capacity at or above a value of 7.2 **[4]**

P.T.O.

b) Discuss different methods used for the removal of toxic compounds. **[3]**

c) Explain the design of Ion- exchange softner. **[3]**

Q5) a) What are the factors influencing the action of disinfectants. **[4]**

b) Explain disinfection with ozone. **[3]**

c) Explain ultraviolet disinfection. **[3]**

Q6) a) Determine the effect of reducing the surface area of an aerated lagoon from 100,000 to 50,000 ft^3 by doubling the depth for the following conditions:

Wastewater flowrate, Q = 1Mgal/d

Wastewater temperature, $T_i = 60\ ^oF$

Air temperature, Ta = 20 ^oF

Proportionality constant, $f = 12 \times 10^{-6}$ **[4]**

b) Explain process kinetics for biological treatment process. **[3]**

c) What are the biological properties of waste. **[3]**

Q7) a) Discuss various types of anaerobic reactors. **[5]**

b) What are the objectives of biological treatment and state its limitations. **[5]**

Q8) Write note on:

a) Ion exchange chemistry and reaction. **[5]**

b) Design of clarifiers. **[5]**

□□□□

Total No. of Questions : 8]

SEAT No. :

P3088

[Total No. of Pages : 2

[4660] - 1306

M.E. (Chemical) (Environmental Engg)

SOLID WASTE MANAGEMENT

(2013 Credit Pattern) (Semester - II) (509138)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
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, and electronic pocket calculator and steam table is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What are Objectives of Solid waste management? **[4]**

b) What are functional elements of Solid waste management? **[3]**

c) Explain Environmental impact of mismanagement. **[3]**

Q2) a) Discuss the factors affecting storage of solid waste. **[4]**

b) Write about Types of collection systems. **[3]**

c) Discuss Economic analysis of solid waste management. **[3]**

Q3) a) Discuss on typical material recovery. **[4]**

b) How the Sorting operations are carried out. **[3]**

c) How to recover metal from waste. **[3]**

Q4) a) Write the principle behind composting. **[4]**

b) What are the Factors affecting composting? **[3]**

c) What is Vermicomposting? **[3]**

P.T.O.

Q5) a) Explain Pyrolysis. **[4]**

b) Write in brief about Incineration. **[3]**

c) Explain Biomethanation process. **[3]**

Q6) a) Explain Energy recovery from solid waste. **[4]**

b) Explain Fluidized Bed Incineration. **[3]**

c) Explain Advantages of composting. **[3]**

Q7) a) Define Landfill. **[5]**

b) Explain Land filling methods. **[5]**

Q8) a) Give the Present scenario and measures to improve system for different functional elements of solid waste management system. **[5]**

b) What are the Elements of financial management plan for solid waste system.? **[5]**

☼ ☼ ☼

Total No. of Questions :8]

SEAT No. :

P3372

[Total No. of Pages :2

[4660]-1307

M.E. (Chemical) (Environmental Engineering)

INDUSTRIAL WASTE TREATMENT

(2013 Credit Pattern) (Semester - II) (509139)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any 5 questions.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is characterization of industrial waste water? **[4]**

b) Discuss the water budgeting. **[3]**

c) Explain the reuse and recycling concept in water management. **[3]**

Q2) a) Discuss the waste volume reduction. **[4]**

b) Discuss the calcium removal technique from Industrial waste. **[3]**

c) Enlist the techniques for heavy metals removal technique from Industrial waste. **[3]**

Q3) a) Give the distinction between clean up and cleaner technologies. **[4]**

b) Explain the quality and quantity variation in waste discharge. **[3]**

c) Discuss the stream and effluent standards. **[3]**

Q4) The BOD results given below are observed on a sample of wastewater. **[10]**

t, days	1	2	4	6	8	10
BOD, mg/lit	6.5	11	18	22	24	26

Plot BOD curve.

Calculate parameters K_1 & Lu.

P.T.O.

Q5) a) Draw a flowsheet for the treatment of sugar industry wastewater. **[5]**

b) Discuss the sources, characterization and treatments of wastewater in distillery. **[5]**

Q6) Explain the concept, objective, design of common effluent treatment plant. **[10]**

Q7) Discuss the cost-benefit analysis of common effluent treatment plant. **[10]**

Q8) a) Write short note on Advanced wastewater treatment system in Industries. **[5]**

b) Discuss in detail about the oxidation pond. **[5]**

ɛɛɛ

Total No. of Questions : 8]

SEAT No. :

P3402

[Total No. of Pages : 2

[4660] - 1309

M.E.(Chemical) (Environmental Engineering)

REMOTE SENSING AND GIS APPLICATIONS IN ENVIRONMENTAL ENGINEERING

(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) What is the principle of Remote Sensing and its application? What are the different stages of Remote Sensing? **[6]**

b) Explain Active and Passive Remote Sensing system. **[4]**

Q2) a) With a schematic diagram of EMR process, explain EMR interaction with earth's surface. **[5]**

b) What is electromagnetic spectrum and explain electromagnetic spectrum with necessary sketch. **[5]**

Q3) a) What is the utility of sensor in Remote Sensing & explain spatial Resolution. **[5]**

b) What is the principle of classifying Imaging sensor and what are their different types. Explain thermal sensing system. **[5]**

P.T.O.

Q4) a) What is FCC and explain its significance in identification of surface objects? **[6]**

b) Explain the application of aerial photograph in soil mapping of a region. **[4]**

Q5) a) What is Digital imaging processing its necessity and application? Explain the Radiometric correction method. **[6]**

b) What is the necessity of image enhancement and explain contrast enhancement. **[4]**

Q6) a) What is GIS and explain its different components. **[6]**

b) What is Spatial referencing and their types and explain Universal Transverse Mercator. **[4]**

Q7) a) What are the different hardware and software used in GIS application? **[6]**

b) Explain : **[4]**

i) Raster model and

ii) Vector model

Q8) a) Draw typical Data Base Management System (DBMS) components used for queries. **[6]**

b) Explain Hierarchical database Model. **[4]**

Total No. of Questions : 8]

SEAT No. :

P3373

[Total No. of Pages : 2

[4660]-1310

M.E. (Chemical) (Environmental Engineering)

INDUSTRIAL POLLUTION PREVENTION & CLEANER PRODUCTION

(509144) (2013 Credit Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any 5 questions.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Discuss the industrialization and sustainable development. **[5]**

b) What are the indicators of the sustainability? **[5]**

Q2) a) Discuss the environmental policies and regulations to encourage pollution prevention. **[5]**

b) Explain the cleaner technology and cleaner production concept. **[5]**

Q3) a) Discuss historical evolution of pollution prevention and control. **[5]**

b) Explain the role of industries and Government in pollution prevention and control. **[5]**

Q4) a) Write a brief note on source reduction techniques in pollution control. **[5]**

b) Explain the use of Internet information for pollution prevention & cleaner production. **[5]**

Q5) Justify that the process and equipment optimization is important aspect in pollution prevention & cleaner production. **[10]**

P.T.O.

Q6) Discuss the technical and environmental feasibility analysis as well as total cost analysis of pollution prevention & cleaner production program. **[10]**

Q7) Write short notes on: **[10]**

a) Elements of Life Cycle Assessment (LCA).

b) Life cycle costing.

Q8) a) Discuss the Environmental Management system (EMS). **[5]**

b) Write a note on Environmental Audit. **[5]**

Total No. of Questions : 8]

SEAT No. :

P3040

[Total No. of Pages : 2

[4660]-1312
M.E. (Petroleum)
NUMERICAL SIMULATION IN PETROLEUM ENGINEERING
(512101) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic tables, slide rule, electronic pocket calculator is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) Following set of algebraic equations obtained for a steady state problem in Petroleum Industry solve these simultaneous equations with help of any suitable technique: **[5]**

$2x + 3y + z = 9$

$x + 2y + 3z = 6$

$3x + y + 2z = 8$

b) Solve the following equation using any suitable technique: **[5]**

$F(x) = x^3 - 2x - 5.$

Q2) a) Single phase compressible flow in homogeneous and isotropic medium is given by following equation: **[5]**

$$\frac{\partial^2 P}{\partial x^2} = \frac{1}{\alpha}\frac{\partial P}{\partial t}$$

where, $\alpha = \dfrac{k}{\phi \mu c}$

Solve the equation by finite difference technique.

b) Using Euler method solve the following ordinary differential equation:

$\dfrac{dq}{dt} = 18.7\ t^2 + 5.62\ t$ Given: at $t = 0$, $q = 1$. **[5]**

P.T.O.

Q3) a) What do you mean by reservoir simulation? **[3]**

b) Name three commercial simulators commonly used and discuss their utility. **[3]**

c) Name various numerical techniques encountered by these simulators and qualitatively discuss two of them. **[4]**

Q4) Obtain the unsteady state one-dimensional convection/diffusion equation given by

$$\frac{\partial T}{\partial t} + U\frac{\partial T}{\partial x} = \frac{\partial^2 T}{\partial x^2}$$

a) Write an Explicit formulation for above equation (assume U = 0). **[5]**

b) Write a Crank-Nicolson formulation for above equation (assume U = 0). **[5]**

Q5) a) Write down the wish list of an ideal Reservoir Simulator and discuss each of the points briefly. **[4]**

b) What is compositional model? **[2]**

c) Write a short note on solution accuracy and convergence for solving PDEs. **[4]**

Q6) a) Discuss importance of capillary pressure in reservoir simulator. **[4]**

b) What is mobility and mobility Ratio? **[2]**

c) With help of schematic diagram elaborate the applicability of modern simulation techniques for Geothermal Reservoirs. **[4]**

Q7) a) What is the importance of History Match in the Reservoir Simulation? **[3]**

b) With proper diagram explain treatment of wells in reservoir simulation. **[4]**

c) Write a short note on matching pressure history. **[3]**

Q8) a) With help of suitable example explain the discretisation of Black Oil Equations. **[4]**

b) What is IMPES formulation? **[3]**

c) Briefly discuss various challenges to be handled with respect to field data for actual petroleum reservoirs while utilizing available commercial simulators. **[3]**

●●●●●

Total No. of Questions : 7]

SEAT No. :

P3041

[Total No. of Pages : 2

[4660]-1314
M.E. (Petroleum)
ADVANCE DRILLING ENGINEERING
(512103) (2013 Course) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions of the following.***
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.***

Q1) a) Discuss drill string design in detail. **[5]**

b) A drill string consist of 600 ft 8.25" × 2– 13/16" drill collar and rest is 5", 19.5 ppf × 95 drill pipe. If the required MOP is 100,000lb and mud weight is 10.5 ppg. Calculate Max. Depth of the hole that can be drilled when- **[5]**

i) Using new drill pipe P_t = 501.090 lb.

ii) Using class 2 drill pipe having yield strength 394,000 lb, Steel density = 489.5 ppf, buoyancy factor = 0.0847.

Q2) a) Discuss casing seat / shoe depth selection procedure in detail. **[5]**

b) 13-3/8" intermediate casing set at 9750ft, Mud weight 11 ppg, Top of spacer at 1750ft, spacer weight 13 ppg, Top of cement at 3000ft, cement weight 16 ppg, plug bump pressure 2500 psi. Calculate net burst load at casing shoe. **[5]**

Q3) a) Discuss two stage cementation with suitable sketch. **[5]**

b) Data given **[5]**

Lead slurry: 2305m – 1655m, Tail slurry 2395m – 2305m, preflush $5m^3$

Hole depth 2400m, Average diameter of hole 320.7mm,

casing shoe 2395m, length of shoe track 24.38m, Casing OD = 244.5mm, ID = 224.41mm

Calculate lead slurry and tail slurry volume, Displacement volume.

P.T.O.

Q4) a) Discuss BHA for Build, Hold and Drop the angle. **[4]**

b) Discuss balance tangential and Minimum curvature method of directional survey. **[6]**

Q5) Write short note on Any Two: **[10]**

a) Down hole problems.

b) Types of horizontal wells.

c) Inelegant well completion.

d) Drilling fluids.

Q6) Find S profile directional well measured depth. **[10]**

Data given

Horizontal displacement 6000ft, Target depth 12,000ft, TVD KOP 1500ft, BUR 2 deg per 100ft, Dropp off rate 1.5 deg per 100ft, TVD at the end of drop off 11,000 ft, Final inclination 20 deg.

Q7) a) Discuss poission's ratio lies between 0 to 0.5. **[5]**

b) Discuss Mohr's coulomb criteria of rock failure. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3042

[Total No. of Pages : 2

[4660]-1315
M.E. (Petroleum Engineering)
RESEARCH METHODOLOGY
(2013 Course) (Credit) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt Any Five questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Illustrate your answers with suitable examples and diagrams, wherever necessary.***
4) ***Write relevant question number before writing the answer.***

Q1) a) Describe the different types of research, clearly pointing out the difference between an experiment and a survey? **[4]**

b) Explain the nature and functions of a hypothesis in a research process. **[3]**

c) Plan an action research project and describe the various steps which are followed in completing the project. **[3]**

Q2) a) What is research problem? Define the main issues which should receive the attention of the researcher in formulating the research problem. Give suitable examples to elucidate your points. **[4]**

b) Discuss characteristics of good problem and criteria for evaluating a problem. **[4]**

c) State the importance of citations in scientific research. **[2]**

Q3) a) Indicate the criteria for a good case study. Justify that it is method as well as technique of research. **[4]**

b) What do you mean by research design? Give its classification in tabular form. Give comparison between exploratory, descriptive and causal research designs. **[4]**

c) Indicate the ethical consideration in data collection and their justification in conducting a research. **[2]**

P.T.O.

Q4) a) Indicate the general format of research report and mention its specific category of each major section of report. **[4]**

b) Enumerate the essential characteristics of a good experimental design and purpose in research studies. **[4]**

c) Explain in brief the importance of data analysis in research. **[2]**

Q5) a) What is basic principle of ANOVA? Explain the steps involved in ANOVA technique. **[4]**

b) What is meant by sampling design? Critically examine the various types of sampling design techniques. **[4]**

c) Explain the technique and importance of oral presentation of research findings. **[2]**

Q6) a) Discuss and evaluate the methods of collecting primary and secondary data? **[4]**

b) What is a blog? List common blogging sites available. Explain the various steps involved in creation of a blog. **[4]**

c) What is the difference between structured and unstructured interviews? Discuss with examples. **[2]**

Q7) a) Describe various steps of preparing research tool and evaluate their significance as tools of scientific research. **[5]**

b) What is literature review? State Creswell's five steps to conduct literature review. Discuss the various sources of literate review. **[5]**

Q8) a) Write notes on (Any Two): **[5]**

i) Basic and Applied Research.

ii) IPR and Technology Transfer.

iii) Footnotes and Bibliography.

iv) Threats and challenges to good research.

b) Discuss in brief characteristics of sound measurement. Explain major criteria for evaluating a measurement tool. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3375

[Total No. of Pages : 2

[4660] - 1317
M.E (Petroleum Engineering)
ADVANCED RESERVOIR ENGINEERING
(2013 Credit Pattern) (Semester - II) (512107)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) What are the assumptions used for deriving the diffusivity equation? **[5]**

b) Draw capillary pressure curves vs. saturations for an oil wet and water wet rocks. Explain them in detail. **[3]**

c) What is meant by effective permeability, absolute permeability and relative permeability? **[2]**

Q2) a) How is conservation of mass used in deriving the diffusivity equation? **[5]**

b) What do you mean by discretization? Why do you discretize? What are the advantages and disadvantages of discretization? **[3]**

c) Write the diffusivity equation in both Cartesian and radial coordinates? Explain each of the terms in the equation. **[2]**

Q3) a) Draw the graph of viscosity, formation volume factor of oil, water and gas with respect to pressure. Explain the trends and give reasons for the particular trends observed in the graphs. **[5]**

b) Write a detailed note on microbial enhanced oil recovery. **[3]**

c) What do you mean by ASP flooding? How is it different from waterflooding and what are the advantages? **[2]**

P.T.O.

Q4) a) Explain the five different types of reservoir fluids, with the help of a phase diagram. **[5]**

b) Explain in detail 5 fluid properties for oil, and how they vary with pressure. **[3]**

c) What do you mean by retrograde condensate reservoirs? Explain in with the help of a diagram. **[2]**

Q5) a) What do you mean by interfacial tension, and how is it measured? Explain in terms of a water wet and oil wet rock. **[5]**

b) Explain the importance of reaction kinetics in an in-situ combustion process. **[3]**

c) What are the screening criteria for implementing a particular EOR method? **[2]**

Q6) a) In EOR, what is the difference between areal and vertical sweep efficiency? **[4]**

b) What is the difference between SAGD and Huff-and-puff method? Explain in detail. **[4]**

c) Write a short note on waterflooding. **[2]**

Q7) Write short notes on :

a) In-Situ combustion-Its advantages, disadvantages and applications. **[5]**

b) Thermal EOR, with its screening criteria. **[5]**

Q8) Explain in detail, what do you mean by:

a) Low and high temperature oxidation. **[5]**

b) Miscible and immiscible displacement. **[5]**

Total No. of Questions : 8]

SEAT No. :

P3043

[Total No. of Pages : 2

[4660]-1318

M.E. (Petroleum Engineering)

ENVIRONMENTAL TECHNOLOGY IN PETROLEUM ENGINEERING

(512108) (2013 Credit Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt Any Five questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Illustrate your answers with suitable examples and diagrams, wherever necessary.***
4) ***Write relevant question number before writing the answer.***

Q1) a) Discuss Current environmental issues faced by oil and gas industry. **[4]**

b) Write a note on: Pretreatment methods for treatment of produced water. **[3]**

c) Discuss in brief on Quality Environment Management and Planning and resource allocation. **[3]**

Q2) a) Discuss the methods used for safe disposal of hazardous waste. **[4]**

b) How NORM is produced through petroleum operations? What precautions are taken for handling and disposal of NORM? **[4]**

c) Explain in brief operational practices and procedures for oilfield waste management. **[2]**

Q3) Write notes on (Any Two): **[10]**

a) Environmental control of drilling fluids.

b) CO_2 Sequestrations.

c) Integrated Environmental Biotechnology in Petroleum Industry.

Q4) a) Discuss accidental discharges in oil and gas industry. What are the effects of these discharges in environment? **[4]**

b) Explain the principle involved in Clean Development Mechanism (CDM). **[4]**

c) What do you mean by Environmental Impact Assessment? **[2]**

P.T.O.

Q5) Write notes on (Any Two): **[10]**

a) Hazards in Oil and Gas industry.

b) HAZOP and HAZAN.

c) Hazard Identification.

Q6) a) What is CO_2 sequestration? Describe the role of petroleum industry in CO_2 sequestration. **[4]**

b) Write a note on: Disaster management in offshore installation. **[4]**

c) Explain the principle of ALARP. **[2]**

Q7) a) Write brief note on: **[5]**

i) JSA.

ii) ATR.

b) Explain the various causes and preventive measures in petroleum industry for fire and explosion hazards. **[5]**

Q8) Write notes on (Any Two): **[10]**

a) Environmental control of drilling fluids.

b) Health and Safety laws applicable in Oil and Gas Industries.

c) Decommissioning of oil and gas installations.

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3376

[Total No. of Pages : 3

[4660]-1319

M.E. (Petroleum)

ADVANCED PRODUCTION ENGINEERING

(512109) (2013 Credit Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Neat diagram 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.***

Q1) a) Define and explain: Productivity Index and IPR. **[5]**

b) Classify different types of artificial lifting techniques and write working principle of sucker rod pumping system in brief. **[3]**

c) Why artificial lifting technique is required for a wellbore? Explain. **[2]**

Q2) a) Describe in detail any one type of multiphase correlation and its application for optimizing wellbore production and equipment. **[5]**

b) Decide depth for point of gas injection in continuous gas lifting system using following data on a graph paper. **[3]**

Depth = 9000 ft. Expected rate = 900 bbls / day. Tubing size = $2^{3/8}$ inch. P_{wh} = 150 psig, SBHP = 3000 psig. P.I. = 3 bbl/day-psi, solution GOR = 250, SCF / STB, Sp. Gravity of injection gas = 0.65, S/C available pressure = 980 psig, °API = 38, Surface Temp. = 120 °F B.H. Temp. = 220 °F. 270 psi / 1000 ft = flowing gradient of FBHP. 22 psi / 1000 ft = casing pressure gradient. Subtract 100 psi from the pressure at point of balance before you fix the point of gas injection.

c) Write in brief detail procedure for sizing of a heater treater. **[2]**

P.T.O.

Q3) a) Draw neat schematic sketch of a typical petroleum production system and describe nodal analysis in brief. **[4]**

b) Discuss working of production facility : Group gathering station. **[4]**

c) Explain: **[2]**

i) Demulsification.

ii) Perforation sizing.

Q4) a) Compare between vertical and horizontal separator. Write the merits of each. **[5]**

b) Write the general design consideration for separation facility and central tank farm? **[3]**

c) Which separator you will recommend in following conditions? Explain the useful features of the separator, required in each of these conditions. **[2]**

i) Onshore processing facility.

ii) Cost effective for higher gas- liquid separation.

iii) For low GOR and to handle solids along with of liquid.

Q5) a) Write usability of ESP, PCP and Jet Pump only in terms of excellent/ good/fair/poor in a tabular form for following well conditions. Low PI, Low GOR, Adaptability to deviated wells, capability to produce sand, high volume lift capability, ability to handle viscous oil and depth limits. **[4]**

b) What is formation damage? Describe various methods to overcome problem of formation damage. **[4]**

c) Draw neat schematic sketch of a vertical heater treater. **[2]**

Q6) a) Describe in brief any two field cases of optimization applied in surface or subsurface production operations. **[4]**

b) What is subsea production system? Draw neat schematic and explain various features of it. **[3]**

c) Write and discuss the advantages and disadvantages of gas lifting system. **[3]**

Q7) a) Define and describe: effective plunger stroke, volumetric efficiency, rod stretch, tubing stretch and counterbalance effect in case of SRP. **[5]**

b) Draw neat schematic sketch of surface and subsurface components of a PCP installed in a wellbore and write functions of each in brief. **[5]**

Q8) a) Derive an equation to calculate opening pressure under operating conditions for a casing pressure operated gas lift valve. **[5]**

b) Discuss optimum GLR and explain, how to calculate daily gas injection rate for gas lifting? **[5]**

Total No. of Questions : 7]

SEAT No. :

P3044

[Total No. of Pages : 3

[4660]-1321
M.E. (Petroleum Engineering)
ADVANCE WELL CONTROL
(512114) (2013 Course) (Semester-III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any five questions.***
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.***

Q1) a) Calculate shut in casing pressure with the following data

well depth - 13,750 ft., SIDDP - 600 psi, MW 12 ppg, Annular volume 0.0459 bbl/ft

influx gradient 0.112 psi/ft

kick size 30 bbls. **[4]**

b) After observing self flow the well is shut in, killing could not be resumed due to power failure.

After 1 hour the drill pipe pressure has risen to 575 psi due to closed well migration. Calculate volume to bleed to keep the BHP constant.

TVD - 11.200 ft, Mud weight 12.3 ppg, kick size 25 bbls, SIDPP 420 psi, gas gradient 0.115 psi/ft. **[4]**

c) Discuss positive kick signs in detail. **[2]**

Q2) a) Calculate reduction in bottom hole pressure if a driller has pulled out 17 stands, of 5" drill pipe dry without filling hole.

Drill pipe capacity 0.0176 bbl/ft

Drill pipe steel displacement 0.0080 bbl/ft

Casing capacity 0.0733 bbl/ft

Length of one stand 88 ft.

Mud weight 12 ppg. **[4]**

P.T.O.

b) A casing is set at a depth of 6260ft and TVD of casing shoe is 3680 ft. After drilling shoe and new formation, leak off test was conducted with 9.8 ppg mud. It was found that the formation fracture gradient is 0.618 psi/ft. Find out MAASP. **[3]**

c) Discuss soft shut in with suitable sketch. **[3]**

Q3) a) A BOP stack has 5000 psi working pressure ram with closing ratio of 5.6:1, if hydraulic fluid requirement for all functions of Bop stack is 148.5 gallons including safety factor, calculate the minimum number of bottles required.

Pre charge pressure 1000 psi, Maximum operating pressure 3000 psi, Bottle capacity. **[4]**

b) A well is being killed using wait and weight method at 25 spm with following data

Well depth 9500ft, shoe depth 6000ft, string volume 1600 stks, annulus volume 6000 stks

SIDPP 400 psi, SICP 600 psi, original mud weight 12ppg.

After 1000 stks, pump speed changed from 25 spm to 35spm keeping casing pressure constant. What will be the pumping pressure now? **[4]**

c) What is trip margin? **[2]**

Q4) a) Explain wait and weight method graphically. **[5]**

b) Explain BOP accumulator system with illustrative figure. **[5]**

Q5) Write short note on: **[10]**

a) Snubbing operation.

b) Well control considerations in horizontal well.

Q6) a) Discuss close well and open well gas migration. **[5]**

b) Discuss BOP function test in detail. **[5]**

Q7) 8-1/2" hole depth 13600MD /5000TVD ft, Kick off point 2000ft, End off build up 5400 MD

4285 TVD ft, 9-5/8" casing set at 9000 MD/ 4600 TVD ft, Drill Pipe 5" capacity 0.0178 bbl/ft

5" HWDP 180ft, capacity 0.0087 bbl/ft.

6.5" drill collar 150ft capacity 0.0061bbl/ft

Mud in use 10.9 ppg, volume open hole to drill collar 0.0323 bbl/ft.

LOT data: shoe leaked at 1120 psi with 10.4 ppg Mud

Mud pump out put 0.12 bbl/stks

SCR pressure 625psi @ 30 spm

SIDPP = 875 psi, SICP = 895 psi

Use driller's method.

Calculate

i) Kill mud weight.

ii) ICP.

iii) FCP.

iv) Dynamic pressure loss at KOP.

v) Remaining SIDPP at KOP. **[10]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3377

[Total No. of Pages : 2

[4660] - 1322
M.E (Petroleum Engineering)
ADVANCED WELL TESTING
(2013 Credit Pattern) (Semester - III) (512113)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) Derive the continuity equation for a single phase fluid flowing through a one dimensional porous media, in radial coordinates. **[5]**

b) What are the various flow regimes that are witnessed in a horizontal well test? **[3]**

c) What is meant by transient, pseudo steady state and steady state flow regime? **[2]**

Q2) a) What do you mean by the continuity equation? What are the assumptions that are used to derive the same? **[5]**

b) Explain the concept of superposition in space, with appropriate diagrams. **[3]**

c) What are the assumptions used for deriving the diffusivity equation? **[2]**

Q3) a) What are the objectives of a well test? Explain in detail. **[5]**

b) What do you mean by DST? Explain with its different time phases. **[3]**

c) How is a DSTdifferent from a PBU and DD test? **[2]**

P.T.O.

Q4) a) What is the difference between isochronal and modified isochronal test? **[5]**

b) Explain why a gas well test is different from an oil well test. **[3]**

c) Explain what is meant by pseudo pressure. **[2]**

Q5) a) What is the use of superposition in time, in well test interpretations? Explain with diagrams. **[5]**

b) Explain how the pseudo-pressure function behaves with pressure, with the help of a graph. **[3]**

c) What slopes are observed in a pressure derivative plot of a fractured horizontal well? **[2]**

Q6) a) What is the difference between analytical and empirical decline curves? Explain in detail. **[4]**

b) What do you mean by Nodal Analysis? What is it's use, and its application in the oil and gas industry? **[4]**

c) What happens when you change the node position in Nodal Analysis? Explain with graphs. **[2]**

Q7) Write short notes on :

a) Types of graphs used in decline curve analysis. **[5]**

b) Fetkovich and Blasingame decline curves. **[5]**

Q8) Explain in detail, what do you mean by:

a) Type curves and its usage in well testing. **[5]**

b) Bourdet derivative and its impact on pressure transient analysis. **[5]**

Total No. of Questions : 5]

SEAT No. :

P3089

[Total No. of Pages : 3

[4660]-1336
M.E. (Information Technology)
MATHEMATICAL FOUNDATION OF INFORMATION TECHNOLOGY
(514401) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***

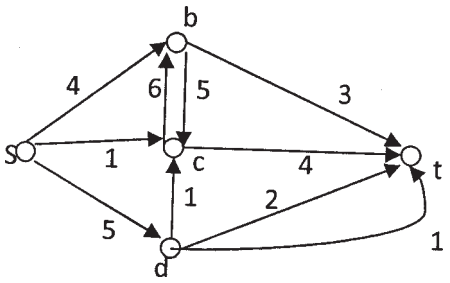
Q1) Solve Any Two:

a) Out of every 100 jobs received at a computing center, 50 are of class 1, 30 of class 2, and 20 of class 3. A sample of 30 jobs is taken with replacement. **[5]**

i) Find the probability that the sample will contain 10 jobs of each class.

ii) Find the probability that there will be exactly 12 jobs of class 2.

b) Define Max-Flow min cut theorem. Find the maximum flow possible in a given transport network. **[5]**



c) Design fuzzy logic system for controlling room temperature. Design a membership function for representing the same system. Assume temperature between 0 to 20 is normal, 20 to 40 is medium and 40 and above high temperature. **[5]**

P.T.O.

Q2) Solve Any Two:

a) Consider a discrete memory less source with seven possible symbols X_i, i=1, 2, ..., 7 and the corresponding possibilities $P(X_1)$=0.37, $P(X_2)$ = 0.33, $P(X_3)$ = 0.16, $P(X_4)$ = 0.07, $P(X_5)$ = 0.04, $P(X_6)$ = 0.02, and $P(X_7)$ = 0.01. Find the entropy and coding efficiency. **[5]**

b) Consider a binary symmetric communication channel, whose input source is the alphabet X = {0, 1} with probabilities {0.5, 0.5}; whose output alphabet is Y = {0, 1}; and whose channel matrix is **[5]**

$$\begin{bmatrix} 1-\varepsilon & \varepsilon \\ \varepsilon & 1-\varepsilon \end{bmatrix}$$

Where ε is the probability of transmission error.

i) What is the entropy of the source, H(X)?

ii) What is the probability distribution of outputs, P(Y) and the entropy of this output distribution, H(Y)?

iii) What is the mutual information of this channel, I(X, Y)?

c) Derive the extension principle for fuzzy logic. **[5]**

Q3) Solve Any Two:

a) Weight of 10 students is as follows: **[5]**

Sr. No.	1	2	3	4	5	6	7	8	9	10
Weight (kg)	38	40	45	53	47	43	55	48	52	49

Can we say that the variance of the distribution of weight of all students from which the above sample of 10 students was drawn is equal to 20 kgs? Test this at 5% and 1% level of significance.

b) There were three candidates for the position of the chairman of a college Mr. X, Mr. Y and Mr. Z whose chances of getting appointments are in the ratio 4:2:3 respectively. The probability that Mr. X if selected would introduce computer education in the college is 0.3. The probabilities of Mr. Y and Mr. Z doing the same are 0.5 and 0.8 respectively. What is the probability that there was computer education in the college? **[5]**

c) Explain the following terms: **[5]**

i) t-test.

ii) z-test.

iii) Chi-Square test.

Q4) a) The number of cars arrived at toll plaza in any given hour is a random variable represented by X. The probability distribution for X is: **[5]**

X	10	11	12	13	14
P(X)	0.4	0.2	0.2	0.1	0.1

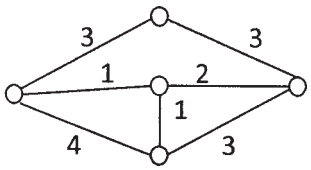
Find the probability that in a given hours:

i) Exactly 14 cars arrives.

ii) At least 12 cars arrives.

iii) At most 11 cars arrive.

b) Find MST using Prim's algorithm also state the drawback of Prim's algorithm. **[5]**



Q5) Solve Any Two:

a) Derive Shannon's information theorem. How it is applicable to channel coding? How will you analyze channel performance. **[5]**

b) Let U = {a, b, c, d} be the domain, A and B be the fuzzy sets on U is given below: **[5]**

	a	b	c	d
A	0.5	0.8	0.0	0.3
B	0.2	1.0	0.1	0.7

Find:

i) $A \cup B$.

ii) A'.

iii) $A \cap B$.

c) Differentiate between Binomial, Poisson, Normal and Gamma distributions. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3235

[Total No. of Pages : 2

[4660] - 1338

M.E. (Information Technology)

ADVANCED OPERATING SYSTEMS

(2013 Credit Pattern) (Semester - I) (514203)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions out of 8.***
2) ***Figures to the right hand indicates questions full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Explain with an example buddy system algorithm in Linux. **[4]**

b) Is zombie a process? Can we kill it? If the child goes in an orphan state, which process in Linux inherits its status? **[3]**

c) What is the first system call that gets called to execute a program in the memory in the Linux OS? Explain it in detail. **[3]**

Q2) a) What is the difference between user-level threads and kernel level threads? In which thread's implementation, kernel is unaware of threads in the user application? Explain this scenario with an example. **[4]**

b) When is the mutex applied and when is the semaphore applied? Also state the APIs for locking and unlocking mutex in POSIX. **[3]**

c) Explain with respect to condition variables: **[3]**

i) pthread _cond_wait.

ii) pthread_cond_signal.

iii) pthread_cond_broadcast.

Q3) a) Explain Linear Page Table organization with example. **[5]**

b) Explain how is protection applied among the processes? **[3]**

c) What are the general fields in a page table designed to provide a virtual memory environment? **[2]**

P.T.O.

Q4) a) Explain how diskmap is allocated in UNIX'S S5FS with example. What is the maximum size of a file in the UNIX? **[4]**

b) Explain the journaling mechanism used in EXT3 file systems? **[4]**

c) What are the operations on a directory? Is inode allocated for a directory? **[2]**

Q5) a) What is distributed system? **[2]**

b) Explain the logical clock synchronization in a distributed system with example. **[4]**

c) What is the need for leader selection in distributed system? Explain the ring based election algorithm. **[4]**

Q6) a) Explain the concept of consistency model in DSM. Explain strict and FIFO consistency models with example. **[5]**

b) Differentiate between message passing and RPC mechanisms in the distributed system. **[3]**

c) Explain how a message passing is implemented in the distributed system. **[2]**

Q7) a) What do you mean by load estimation policy? Explain in detail different load estimation policies. **[5]**

b) What do you mean by load transfer policy? Explain different load transfer policies. **[5]**

Q8) a) Write a short notes on (Any one). **[5]**

i) Distributed Application Development using SUN RPC

ii) Process Addressing in Message Passing

iii) File sharing semantics

b) Write a short notes on (Any one) **[5]**

i) Optimal task assignment

ii) Page based DSM

iii) Thrashing in Distributed Shared Memory.

☼ ☼ ☼

Total No. of Questions : 5]

SEAT No. :

P3091

[Total No. of Pages : 2

[4660]-1339
M.E. (Information Technology)
RESEARCH METHODOLOGY
(514404) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Define Research? Write the objectives of research. What are the main steps which are included in the research process? **[5]**

b) Describe the difference between random, systematic, stratified, cluster, and multistage sampling. **[5]**

Q2) a) Recommend an appropriate data collection method in the following situations. Provide justification for your choice: **[5]**

i) When topic is highly technical and specialized and complex.

ii) When population is illiterate.

iii) When topic is related to understanding attitude of college going students.

iv) When understanding buying behavior of shoppers in a mall.

b) Enumerate the different methods of collecting data. Which one is the most suitable for conducting enquiry regarding family welfare program in India? Explain its merits and demerits. **[5]**

Q3) a) "Pandit Auto" one of the leading automobile companies in India, lost market share to its competitor Hero Honda in the late 2000's. In order to regain its market share, the company plans to find out the reason for its failure in the market. You are appointed as a research to M/s Pandit Auto based on following questions: **[5]**

P.T.O.

i) What type of research design would you prefer? Support your answer with reasons.

ii) State the sources through which Vijay Auto can obtain primary data.

iii) How would you prepare a research support?

b) Differentiate between alternative hypotheses and null hypotheses. Indicate the main characteristics of a good hypothesis and uses of a hypothesis in various types of research studies. **[5]**

Q4) a) A random sample of size 20 is taken, resulting in a sample mean of 16.45 and a sample standard deviation of 3.59. Assume 'X' is normally distributed and use this information and to test the following hypotheses. **[5]**

b) Define the term 'Hypothesis'. Highlight the procedure of developing a good hypothesis. **[5]**

Q5) a) Explain the following terms used in a research. **[5]**

i) Research proposal or synopsis or outline of a research project,

ii) Research report, or thesis or dissertation,

iii) Research Summary, and

iv) Research Abstracts.

b) Write short notes on the following: **[5]**

i) Report writing is an art.

ii) Secondary data.

iii) Significance of sampling.

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3092

[Total No. of Pages : 2

[4660]-1341
M.E. (Information Technology)
WIRELESS COMMUNICATION TECHNOLOGIES
(2013 Credit Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions from eight questions.***
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.***

Q1) a) What are the characteristics of a wireless channel? **[2]**

b) Describe an architecture and components of PRNET. **[4]**

c) What are issues in designing Routing Protocol for ad-hoc wireless networks? **[4]**

Q2) a) Differentiate between wired and wireless networks. **[3]**

b) Explain working of Wireless Routing Protocol. **[3]**

c) Discuss different challenges in designing ad-hoc mobile network. **[4]**

Q3) a) State designing issues of multicast Routing Protocols. **[3]**

b) What are the characteristics of an ideal routing protocol of ad hoc wireless networks? **[3]**

c) Explain in brief Energy Efficient Multicast Routing. **[4]**

Q4) a) List different multicast routing Protocols? Give one example of each. **[4]**

b) Explain in detail working of LAR. **[4]**

c) Scalability is not possible in DDM, Justify your answer. **[2]**

P.T.O.

Q5) a) What are various transport layer protocols for ad hoc wireless networks? **[3]**

b) State different attacks at network layer in network protocol stack. **[3]**

c) Explain the SWAN model for QoS in ad-hoc wireless framework. **[4]**

Q6) a) State different issues to provide QoS in ad-hoc wireless networks. **[2]**

b) Explain need of energy management in ad-hoc wireless networks. **[4]**

c) Discuss the requirements of a secure routing protocol for ad-hoc wireless network? **[4]**

Q7) a) Explain concept of cryptography in Key Management. **[5]**

b) Write a short note on - System Power Management Schemes. **[5]**

Q8) a) Discuss the INORA, QoS Frameworks for ad-hoc wireless network. **[5]**

b) How security-aware AODV protocol provides solution against black-hole attack? **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3093

[Total No. of Pages : 2

[4660]-1342
M.E. (Information Technology)
ADVANCED DATABASE SYSTEMS
(514408) (2013 Credit Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***

Q1) a) What is distributed database system? What are the advantages and potential problems of Distributed databases? **[5]**

b) Give a brief account of architectural models for distributed DBMS. **[5]**

Q2) a) Explain allocation problem taking into account fragments, networks and running applications. **[5]**

b) What is horizontal and vertical fragmentation? Explain with examples. Also, discuss the correctness rules for fragmentation. **[5]**

Q3) a) What are the layers of query processing? Explain with the help of generic layering schematic diagram. **[5]**

b) Explain R* algorithm of query optimization. **[5]**

Q4) a) How do you perform deadlock management in distributed environment? **[6]**

b) What is the classification of concurrency control algorithms? Explain with neat sketch. **[4]**

Q5) a) Explain through diagrams the following: shared disk architecture, shared nothing architecture, hierarchical architecture and cache-only architecture. **[6]**

b) What are the architectural issues in distributed object DBMS. **[4]**

P.T.O.

Q6) a) Explain star and snowflake schema of multidimensional data warehouse. **[4]**

b) Explain Distributed 2PL Algorithm. **[6]**

Q7) a) What are the categories of data warehouses? Explain. **[5]**

b) With the neat sketch write and explain KDD process. **[5]**

Q8) a) Explain Object Server and Page server architecture. Draw neat figures. **[5]**

b) What are various data mining functionalities or techniques. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3094

[Total No. of Pages : 2

[4660]-1343
M.E. (Information Technology)
ADVANCE COMPUTER ARCHITECTURE
(514409) (2013 Credit Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) Explain various types and levels of parallelism with neat diagram. **[4]**

b) Enlist and explain classification of parallel architecture. **[2]**

c) Describe Flynn's classification for different types of computer systems. Discuss MIMD & SIMD in detail. **[4]**

Q2) a) How the data hazards are overcome with the help of dynamic scheduling. **[4]**

b) Explain the concept of dynamic scheduling in ILP. **[2]**

c) How instruction level parallelism is exploited using dynamic scheduling, multiple issues & speculation? **[4]**

Q3) a) Write note on Hardware and software speculation. **[4]**

b) Enlist the limitations on ILP for Realizable processors. **[2]**

c) Compare thread level and instruction level parallelism. Why thread level parallelism is considered as an alternative to ILP? **[4]**

Q4) a) Explain symmetric and shared memory architecture in detail. **[4]**

b) Write a note on snooping protocol. **[3]**

c) Describe Buses, Crossbar and Multistage switches in multiprocessing. **[3]**

P.T.O.

Q5) a) Explain software and hardware multithreading. **[4]**

b) Explain design issues in multi-core architectures. **[3]**

c) Discuss issues associated with cache coherency in multiprocessor systems. **[3]**

Q6) a) What is Memory Technology? Explain SRAM and DRAM technology. **[4]**

b) How protection takes place in case of virtual memory? **[4]**

c) Explain Memory Hierarchy Design. **[2]**

Q7) a) Explain Fine-grain and Coarse Grain SIMD architecture. **[5]**

b) Write notes on: **[5]**

i) Sequential Control Flow.

ii) Dataflow Model.

Q8) a) Explain Intel core DUO architecture with neat block diagram. Address the different multi-core issues in this architecture. **[5]**

b) Explain different types of cache used in multicore system organizations, with their respective block diagrams. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3095

[Total No. of Pages : 2

[4660]-1345
M.E. (Information Technology)
INFORMATION ASSURANCE AND SECURITY
(2013 Credit Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions from eight questions.***
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.***

Q1) a) Define Espionage and Vandalism. **[2]**

b) Explain the critical components of Information security with example. **[4]**

c) Write short note on secSDLC. **[4]**

Q2) a) What are the components of an Information Security? **[3]**

b) Differentiate between False Accept Rate and False Reject Rate. **[3]**

c) How is an application layer firewall different from a packet-filtering firewall? Why an application layer firewall is sometimes called a proxy server? **[4]**

Q3) a) Enlist features of Enterprise Information Security Policy (EISP) and Issue Specific Security Policy (ISSP).How they differ? **[3]**

b) Explain the term “computer forensics”. Give its significance in security. **[3]**

c) Why is data the most important asset of an organization? State other assets in the organization that require protection? **[4]**

P.T.O.

Q4) a) What do you mean by Digital Forensics? List the uses. **[4]**

b) Consider the statement: an individual threat agent, like a hacker, can be a factor in more than one threat category. If a hacker hacks into a network, copies a few files, defaces the Web page, and steals credit card numbers, how many different threat categories does this attack fall into? **[4]**

c) What measures can individuals take to protect against shoulder surfing? **[2]**

Q5) a) Differentiate between a denial-of-service attack and a distributed denial-of-service attack? Which is more dangerous and Why? **[3]**

b) What is information extortion? Describe how such an attack can cause losses with an example. **[3]**

c) Discuss various firewall processing modes. **[4]**

Q6) a) Discuss different types of security policies. **[2]**

b) What are the differences between a policy, a standard, and a practice? **[4]**

c) Why do employees constitute one of the greatest threats to information security? **[4]**

Q7) a) Define Cyber Crime. Enlist at least six types of cyber crime. **[6]**

b) How does a network-based IDPS differ from a host-based IDPS? **[4]**

Q8) a) What is risk management? Why is the identification of risks, by listing assets and their vulnerabilities, so important to the risk management process? **[5]**

b) How do screened host architectures for firewalls differ from screened subnet firewall architectures? Which of these offers more security for the information assets that remain on the trusted network? **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3096

[Total No. of Pages : 3

[4660]-1346
M.E. (Information Technology)
NETWORK PROGRAMMING
(514414) (2013 Course) (Semester-III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) Differentiate between passive open and active open in client/server communication using TCP. **[2]**

b) List out different states separately for connection establishment and connection termination. How state transition diagram is used to describe the working of TCP connection between client and server? **[4]**

c) Discuss about packet exchanged between client and server for connection establishment and connection termination. **[4]**

Q2) a) Describe byte manipulation functions used in socket communications. How select() function is used by the server to handle multiple client requests? **[4]**

b) How byte ordering may affect the client server communication over a TCP network? **[2]**

c) Write a program using TCP socket to perform arithmetic operations. Where multiple clients can request to the concurrent server for a specific task to be performed. **[4]**

Q3) a) Name the domain and type for creation of Routing Sockets. Routing socket is not specific to any network protocol, but it is used to write information into the kernel, justify with clear syntax of it working in the network programming. **[4]**

P.T.O.

b) Write the structure for data link socket and explain about the significance of each members of the structure. **[4]**

c) List out different types of messages exchanged across a routing socket with brief descriptions. **[2]**

Q4) a) Programmer does not to take care about the ordering of the bytes in the packets, what are the functions used to maintained the byte orders properly and how these functions are used in the network communications? **[4]**

b) With suitable diagrams describe the steps performed by the UDP client and UDP server, also mention the functions not required in UDP based communications as compare to TCP based systems. **[3]**

c) With diagrammatic representation, describe the functioning of resolvers and name servers in detail. **[3]**

Q5) a) IPv4 server handles a request from IPv6 clients and provides interoperability; discuss the steps IPv4 server handles for processing of IPv6 clients depending on address types and socket types. **[4]**

b) Listout IPv6 Address-Testing Macros and describe purpose of each macro in brief in association with interoperability in communications. **[3]**

c) Write various steps used by IPv6 server to handle an IPv4 TCP client as well as an IPv6 TCP client in a typical client/server communications.**[3]**

Q6) a) Describe the mapping of IPv4 and IPv6 multicast addresses to Ethernet addresses with neat diagrammatic representation shows it's functioning. **[4]**

b) SNTP in used to synchronize clocks across a WAN or a LAN, how it works to provide clock synchronization in communication? Give some examples of NTP packet formats used for synchronization. **[4]**

c) Write the steps taken as the multicast packets go from the sender to all the receivers on a WAN. **[2]**

Q7) a) With exact prototypes explain the use of pthread_create() and pthread_join() functions in brief. What are thread specific data? Write about information maintained by each thread with suitable examples. **[5]**

b) Write a program using POSIX thread to implement echo server using one thread per client. Program should contain clear comment about the functions used in the program. **[5]**

Q8) a) Compare the concurrent server created using threads and fork() in detail with suitable segment of codes to describe the working nature of thread based and fork() based concurrent servers. **[5]**

b) Write a program for TCP concurrent server, where one child process is created to process per client's request. Include proper comments for each operation in brief. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3098

[Total No. of Pages : 2

[4660]-1361

M.E. (Instrumentation & Control) (Process Instrumentation)

INDUSTRIAL AUTOMATION

(2013 Course) (Semester-I) (506103)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) Explain in brief Sequential Function Chart. **[5]**

b) Discuss in brief with suitable block diagram any two major components of the DCS. **[5]**

Q2) a) Explain in brief typical architecture of DCS. **[5]**

b) Develop programmable ladder diagram for flashing of lamp for every 25 seconds. **[5]**

Q3) a) Develop Programmable Ladder diagram for mixing of two liquids as per below Sequence: When the start P.B. is pressed, the inlet valve A switches ON till the middle level sensor has not sensed the liquid. When middle level is sensed inlet valve B switches ON till the high level sensor has not sensed the liquid. Then the motor spins the stirrer for 10 seconds for mixing of both the liquids. After this drain valve switches ON and remains on till the low level is not reached. **[5]**

b) What is an OPC? Explain in brief. **[5]**

P.T.O.

Q4) a) Describe the data flow and number conversion involved in PLC analog operation. **[5]**

b) Explain working principle of HART protocol in detail. **[5]**

Q5) a) Explain different types of 'Sequencer'. **[5]**

b) List and explain various major types of PLC analog inputs and outputs. **[5]**

Q6) a) Describe in brief SCADA. **[5]**

b) What do you understand by safety system? **[5]**

Q7) a) Two lights are to flash on and off at different intervals. One is on 4 seconds and off 4 seconds. The other is on for 7 seconds and off 7 seconds. Two lights are to flash alternately, one for 4 seconds, one for 7 seconds. After five cycles both lights must go off. **[5]**

b) Comment on Process Hazard Analysis **[5]**

Q8) a) The input sensor signal varies from 4 to 20 mA. If the sensor signal exceeds 8 mA blue lamp must be turn on. Further, if the sensor singal is between 12 to 20 mA red lamp must go on. Develop programmable ladder diagram for the same. **[5]**

b) Explain HAZOP w.r.t. **[5]**

i) Definition.

ii) Objectives.

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3236

[Total No. of Pages : 2

[4660]-1362
M.E. (Instrumentation & Control) (Process & Biomedical)
RESEARCH METHODOLOGY
(506104) (2013 Credit Pattern) (Semester-I)

Time : 2 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) What do you mean by research? Explain its significance in modern times. **[5]**

b) Briefly describe the different steps involved in a research process. **[5]**

Q2) a) What do you mean by 'lines of regression'? **[5]**

b) "The task of defining the research problem often follows a sequential pattern". Explain. **[5]**

Q3) a) Discuss in brief with suitable example Principal component analysis. **[5]**

b) Explain in brief role of multivariate analysis in marketing research/research methodology. **[5]**

Q4) a) Describe the different types of research, clearly pointing out the difference between an experiment and a survey. **[5]**

b) What are sources of research problem? **[5]**

P.T.O.

Q5) a) What is multiscale modeling? Explain with one example. **[5]**

b) How to estimate parameters? What are different methods for analyzing estimated parameters. **[5]**

Q6) a) How do objectives help in hypothesis formulation? Explain and illustrate. **[5]**

b) Explain the difference between R^2 and adjusted R^2. **[5]**

Q7) a) Discuss the scope of primary data in research. Also discuss features of questionnaire method. **[5]**

b) Mention different types of report, particularly pointing out the difference between a technical report and a popular report. **[5]**

Q8) a) What is the relevance of Setting objectives in research? How are the objectives set? **[5]**

b) Explain the significance of a research report and narrate various steps involved in writing such a report. **[5]**

●●●●●

Total No. of Questions :8]

SEAT No. :

P3099

[Total No. of Pages :2

[4660]-1364

M.E. (Instrumentation & Control) (Process Instrumentation)
ADVANCED PROCESS CONTROL
(2013 Credit Pattern) (506107)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions.***
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.***

Q1) a) Explain design procedure of MRAS using Lyapnov rule. **[5]**

b) What is the significance of SPC in process plants? **[5]**

Q2) a) Discuss in brief effect of 'Interaction'. **[5]**

b) Explain with suitable block diagram "Feedforward Control". **[5]**

Q3) a) Discuss in brief dynamics of second order process to identify key performance characteristics. **[5]**

b) Explain with example control chart. **[5]**

Q4) a) Explain design procedure of IMC for FOPDT process. **[5]**

b) What is the need of Mathematical Model in process control? **[5]**

Q5) a) Describe with suitable application Feedback controller. **[5]**

b) Explain in brief self tuning regulator. **[5]**

Q6) a) Discuss in brief MIT rule and its application to a first order system. **[5]**

b) Explain in brief Decoupling of control loops. **[5]**

P.T.O.

Q7) a) A process has the T.F. $G(s) = \frac{b}{s(s+1)}$, Where b is a time varying parameter.

The system is controlled by a proportional controller $u(t) = k(u_c(t) - y(t))$, It is desirable to choose feedback gain so that the closed loop system has the T.F. $G_m(s) = \frac{1}{s^2 + s + 1}$, Design MRAS that gives the desired result. **[5]**

b) What is DMC? State its importance. **[5]**

Q8) a) Describe the process reaction curve method for identifying dynamic models. **[5]**

b) Comment on Tuning of cascade controller. **[5]**

ℰ ℰ ℰ

Total No. of Questions : 8]

SEAT No. :

P3378

[Total No. of Pages : 2

[4660]-1365

M.E. (Instrumentation & Control) (Process Instrumentation)

EMBEDDED SYSTEM DESIGN

(506108) (2013 Credit Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

Q1) a) Explain with neat block schematic UART transmitter of AT Mega 8535 AVR microcontroller. **[4]**

b) Explain with neat schematic Port-A of AT Mega 8535 AVR microcontroller. **[4]**

c) Explain timer/counter 0 control register (TCCRO) of AT Mega 8535 AVR microcontroller. **[2]**

Q2) a) Explain with neat block schematic watchdog timer of AT Mega 8535 AVR microcontroller. **[4]**

b) Explain different Reset Sources of AT Mega 8535 AVR microcontroller. **[4]**

c) Explain how the baud rate is set for AVR microcontroller? **[2]**

Q3) a) Explain with neat block schematic 5-stage pipeline ARM organization. **[4]**

b) What are the advantages of using Thumb instructions? **[4]**

c) Explain the following instructions with proper syntax and example **[2]**

i) MVN ii) SBC

iii) BX iv) BIC

P.T.O.

Q4) a) Explain memory organization of ARM processor. **[4]**

b) Explain the Thumb stack operation instruction with proper syntax. **[4]**

c) Explain different ARM Development Tools. **[2]**

Q5) a) Explain how multiple processors can be connected on RS-485 bus. **[4]**

b) Explain with neat schematic PC Parallel Port. **[4]**

c) Compare between SPI vs. I^2C. **[2]**

Q6) a) Explain standard CAN architecture. **[4]**

b) Describe the four primary benefits of CAN protocol provides. **[4]**

c) Describe the features of USB. **[2]**

Q7) a) Explain FPGA architecture. **[4]**

b) Explain the basic logic programming elements of the FPGA with a suitable example. **[3]**

c) Explain traditional FPGA design flow. **[3]**

Q8) a) What is the difference between a FPGA and an ASIC? **[4]**

b) Explain in brief about FPGA based system design. **[3]**

c) Why SRAM based FPGAs are popular when compared to other types? **[3]**

●●●●●

Total No. of Questions :5]

SEAT No. :

P3100

[Total No. of Pages :2

[4660]-1366

M.E. (Instrumentation & Control) (Process Instrumentation)
ADVANCED CONTROL SYSTEM
(2013 Course) (Semester -II) (506109)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figures to the right candidates indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) Attempt any two of the following:

a) Explain different nonlinearities in control system. **[5]**

b) Explain dead zone and ideal relay with their mathematical representation. **[5]**

c) Define singular point. Also explain different natures of singular points with neat diagrams. **[5]**

Q2) Attempt any two of the following:

a) Define describing function? Find describing function for saturation. **[5]**

b) Explain describing function analysis of non-linear system with necessary diagrams. **[5]**

c) Discuss how to find limit cycles of nonlinear system using describing function with necessary diagrams. **[5]**

Q3) Attempt any two of the following:

a) Explain stability in the sense of Lyapunov with graphical representation. **[5]**

P.T.O.

b) Show that following quadratic form is positive definite.

$$V(x) = 10x_1^2 + 4x_2^2 + 3x_3^2 + 2x_1x_2 - 4x_1x_3 - 2x_2x_3$$ **[5]**

c) Determine the stability of a non-linear system governed by equation **[5]**

$$\dot{x}_1 = -x_2$$
$$\dot{x}_2 = -x_1 + 2x_1^2x_2$$

Q4) Attempt any two of the following:

a) Explain zero dynamics in feedback linearization with example. **[5]**

b) Explain input-output linearization in detail with example. **[5]**

c) Explain input-state linearization in detail with example. **[5]**

Q5) Attempt any two of the following:

a) Design a sliding mode control for a double integrator system. Use linear sliding surface. Also draw its approximate phase portrait. **[5]**

b) With reference to sliding mode control theory explain control, surface and reachability in detail with necessary diagrams. **[5]**

c) Explain different techniques used for avoidance of chattering in SMC. **[5]**

EEE

Total No. of Questions : 5]

SEAT No. :

P3237

[Total No. of Pages : 2

[4660]-1368
M.E. (Instrumentation & Control) (Process Instru.)
ADVANCED SIGNAL PROCESSINGS
(606101) (2013 Course) (Semester-III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Attempt any two question from Q.1, Q.2, Q.3, Q.4 and any one question from Q.5.***
3) ***Neat diagram must be drawn whenever necessary.***
4) ***Figure to the right candidates indicate full marks.***
5) ***Use of electronic pocket calculator.***
6) ***Assume suitable data, if necessary.***

Q1) a) Compute four point DFT of given sequence $x(n) = \left\{\underset{\uparrow}{2}, 1, 2, 1\right\}$. **[5]**

b) Enlist different characteristic of STFT explain any two in details. **[5]**

c) Explain Decimation In Frequency FFT algorithm. **[5]**

Q2) a) Explain Least Mean Square Algorithm with filtering & adaptive process. **[5]**

b) Discuss different properties of Complex Cepstrum. **[5]**

c) Give the Application of Homomorphic Deconvolution in areas of Signal Processings in reverberant environment. **[5]**

Q3) a) What do you mean inter-band positioning, explain Even integer band positioning. **[5]**

b) Explain given properties of Wavelet, Scaling, Shifting, Q Filtering. **[5]**

c) Explain sampling conversion by rational I/D. **[5]**

P.T.O.

Q4) a) Polyphase matrix for a three-channel PR reconstruction FIR QMF bank is $P(z^3)=\begin{bmatrix}1 & 1 & 2\\ 2 & 3 & 1\\ 1 & 2 & 1\end{bmatrix}$. Determine the analysis and synthesis filters in QMF bank. **[5]**

b) Explain DCT and DST matrices in cosine Modulation filter bank. **[5]**

c) Explain terms Transform Coding and LOT. **[5]**

Q5) a) Explain the Levinson-Durbin Algorithm for solution of Normal Equations. **[10]**

b) Enlist different Nonparametric methods for power spectrum estimation, explain any two in details. **[10]**

●●●●●

Total No. of Questions :7]

SEAT No. :

P3101

[Total No. of Pages :2

[4660]-1369

M.E. (Process Instrumentation & Control)

BUILDING AUTOMATION

(2013 Credit Pattern) (606102)

Time : 2 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figure to the right candidates indicate full marks.***
4) ***Use of logarithmic tables slide rule, mollier charts, electronic pocket calculator and steam table is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain with neat sketch various stages of fire. **[6]**

b) Write a short notes on SLC Protocol. **[4]**

Q2) a) Explain Intelligent Acess Control System with neat sketch. **[6]**

b) Write a Short notes on Perimeter Intrusion Detection System (PIDS) **[4]**

Q3) a) Explain single duct constant volume for multiple zone HVAC system with neat sketch. **[6]**

b) Explain Human comfort zone. List different factors affecting to Human comfort. **[4]**

Q4) a) Describe cooling system of HVAC System. **[6]**

b) Write a short notes on Air Handeling Unit (AHU). **[4]**

Q5) a) Explain Multiloop controller of DDC. **[6]**

b) Write a short notes on BAC Net Protocol. **[4]**

P.T.O.

Q6) a) Explain Green Building. **[6]**

b) What do u mean by energy management, Explain type of energy management device. **[4]**

Q7) a) Explain project life cycle management with neat sketch. **[6]**

b) Write a short notes on Total Cost Management. **[4]**

EEE

Total No. of Questions : 8]

SEAT No. :

P3102

[Total No. of Pages : 3

[4660] - 1371

M.E. (Instrumentation and Control) (Biomedical Instrumentation)
MATHEMATICAL METHODS IN INSTRUMENTATION
(Common to Process Instrumentation)
(2013 Course) (Semester -I) (506101)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Solve any 5 questions.***
2) ***Assume suitable data, if necessary.***
3) ***Use of Calculators, log tables, charts is allowed.***
4) ***Figures to the right indicate full marks.***

Q1) a) Check the following vector set B is basis for vector space V = IR^3. **[4]**

u = (3, 1, -4), v = (2, 5, 6), w = (1, 4, 8)

b) Calculate the singular value decomposition of the matrix **[4]**

$$A = \begin{bmatrix} -1 & 1 \\ 2 & 2 \end{bmatrix}$$

c) Define norm of vectors and orthogonal vectors. **[2]**

Q2) a) Let IR^3 have the Euclidean inner product and W be the subspace spanned by the orthogonal vectors x_1 = (0.707, 0, 0.707) and x_2 = (-0.707, 0, 0.707).

If u = (1, 2, 3), find,

i) Orthogonal projection of u on W **[4]**

ii) Component of u orthogonal to W **[4]**

b) Obtain the orthogonal projections of the following vectors on X and Y axis: u = (2, 4), v = (4, 5). **[2]**

P.T.O.

Q3) a) Use the method of least square to fit the straight line $y = a + bx$ to the following data. $x = (0, 1, 2, 3\}$, $y = (2, 5, 8, 11\}$. **[4]**

b) Find the square -roots of 10 and 15 using Newton Raphson method. **[4]**

c) Discuss the applications of Numerical methods. **[2]**

Q4) a) Explain mathematical definition of probability with suitable example. **[4]**

b) Define addition and multiplication theorems of probability. **[2]**

c) Let A and B be events with P(A) = 0.6, P(B) = 0.3, and P(A &B) = 0.2. Find P(A/B), P(B/A) and $P(A^C/B^C)$. **[4]**

Q5) a) Find the constant k such that the function $f(x) = kx^3$ for $0<x<3$ and $f(x) = 0$ for other values of x, is the density function. Compute $P(1<x<2)$. **[4]**

b) Define the probability function for a Poisson distribution and state its mean and variance. **[2]**

c) If 20% of the bolts produced by a machine are defective, determine the probability that out of 4 bolts chosen at random, **[4]**

i) 1 bolt

ii) less than 2 bolts, will be defective.

Q6) a) Define correlation, skewness and kurtosis. **[3]**

b) Find the coefficient of kurtosis of the distribution defined by the normal curve having density $f(x)$ given by following, **[4]**

$$f(x) = \frac{1}{\sqrt{2\pi}} \cdot e^{\frac{-x^2}{2}}, \quad -\infty < x < \infty$$

c) Find the expectation of the sum of points in the tossing a pair of fair dice. **[3]**

Q7) a) Let B = {(1, 0, 0), (0, 1, 0), (0, 0, 1)}. Show B is the basis vector set in vector space V = IR^3. **[5]**

b) Check the following vectors for linearly dependent or independent. **[5]**

$u = (1, 2, -3)$, $v = (1, -3, 2)$, $w = (2, -1, 5)$

Q8) a) Find the probability distribution of boys and girls in families with 3 children, assuming equal probabilities for boys and girls. **[5]**

b) Discuss the cumulative distribution function for a discrete random variable X with simple example. **[5]**

☼ ☼ ☼

Total No. of Questions :8]

SEAT No. :

P3104

[Total No. of Pages :2

[4660]-1373

M.E. (Instrumentation & Control) (Biomedical Instrumentation)

ANALYTICAL INSTRUMENTATION

(2008 Pattern) (2013 Credit Pattern) (Semester - I) (506203)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Solve any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Classify Instrumental methods with suitable examples. Also of give advantages of instrumental methods. **[6]**

b) Write a short note on 'Sample preparation methods in chemical analysis. **[4]**

Q2) a) Write a note on 'Deviation of Beer-Lambert's law'. **[4]**

b) Explain working of double monochromator spectrophotometer with suitable diagram with its advantages and disadvantages. **[6]**

Q3) a) Explain working of Atomic Absorption Spectrophotometer with suitable diagram. **[5]**

b) Explain working of Hollow Cathode Lamp with suitable diagram. **[5]**

Q4) a) Explain working of FTIR Spectrophotometer with suitable diagram. **[5]**

b) Enlist various IR sources and detectors and explain working of one IR source and one detector. **[5]**

Q5) a) Classify various types of chromatography. **[2]**

b) Explain working of High Performance Liquid Chromatography (HPLC) with suitable diagram. **[5]**

c) Explain working of flame ionization detector with suitable diagram. **[3]**

P.T.O.

Q6) a) What do you understand by 'Spin-spin coupling in NMR'. **[3]**

b) Explain FT-NMR with neat diagram. **[4]**

c) Explain working of 'GM counter'. **[3]**

Q7) a) Explain Quadrupole Mass Spectrometer with neat diagram. **[5]**

b) State advantages of double focusing technique in Mass Spectrometer. **[2]**

c) Explain CO analyzer with neat diagrams. **[3]**

Q8) a) What is Raman Effect? Explain Raman Spectrometer with neat diagram. **[4]**

b) Explain with neat diagram 'X'-ray diffractometer'. **[4]**

c) State Bragg's law. **[2]**

EEE

Total No. of Questions :5]

SEAT No. :

P3238

[Total No. of Pages :2

[4660]-1376

M.E. (Instru. & Control) (Biomedical)

TRANSDUCER DESIGN

(2013 Credit Pattern) (Semester - II) (506207)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figure to the right candidates indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) Attempt any two of the following:

a) Discuss role of transducers in measurement of biomedical parameters. **[5]**

b) Explain working principle of pH sensor with neat sketch in detail. **[5]**

c) Give any two techniques used for detection of radioactive radiations. **[5]**

Q2) Attempt any two of the following:

a) In detail explain different signal conditioning circuits used in LVDT. Also give each circuit's importance. **[5]**

b) Discuss signal conditioning circuit of thermister for temperature measurement with zero and span adjustments. **[5]**

c) Explain design of capacitive sensor for level measurement. **[5]**

Q3) Attempt any two of the following:

a) Explain strain gauge transducer for torque measurement with its signal conditioning circuits. **[5]**

b) List different types of force transducers and discuss any one in detail. **[5]**

c) Explain industrial applications of nano sensors. **[5]**

P.T.O.

Q4) Attempt any two of the following:

a) Give selection criteria for electromagnetic flowmeter. Also explain different types excitation used in it. **[5]**

b) Discuss gas sensors in detail with example. **[5]**

c) Explain manufacturing process of MEMS with neat sketch. **[5]**

Q5) Attempt any two of the following:

a) List different Biosensors and explain each sensors application. **[5]**

b) List different Chemical sensors and explain any two in detail. **[5]**

c) Explain LASER application in micromachining operations. **[5]**

ɛɛɛ

Total No. of Questions :8]

SEAT No. :

P3105

[Total No. of Pages :2

[4660]-1377

M.E. (Instrumentation & Control) (Biomedical)

DIGITAL IMAGE PROCESSING

(2013 Credit Pattern) (Semester - II) (506208)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Solve any 5 questions.***
2) ***Assume suitable data if necessary.***
3) ***Use of Calculators, log tables, charts is allowed.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe fundamentals steps in digital image processing system. **[5]**

b) Explain image resolution with suitable example. **[3]**

c) Explain any one application of digital image processing with suitable diagram. **[2]**

Q2) a) Explain the structure of human eye. **[4]**

b) Explain Histogram with suitable example. **[4]**

c) Define path and length of path. **[2]**

Q3) a) Obtain the 2D DCT of the following image. **[5]**

10	20	30
40	50	60
70	80	90

b) Define 2D DFT and explain its properties. **[5]**

Q4) a) Enhance the following image using moving average filter. **[5]**

1	2	3
4	5	6
7	8	9

b) Explain image enhancement in frequency domain using Butterworth low pass filter. **[5]**

P.T.O.

Q5) a) What is image restoration? State its applications. **[3]**

b) Explain the process of image restoration. **[3]**

c) Explain image restoration using inverse filter and its digital implementation. **[4]**

Q6) a) Define Pattern and pattern classification. **[4]**

b) Discuss the applications of discriptors. **[3]**

c) Compare sobel and canny operators for edgedetection. **[3]**

Q7) a) Enhance the following image using high pass filter. **[5]**

1	2	3
4	5	6
7	8	9

b) Detect edges in the following image using prewitt operator. **[5]**

1	0	1
0	1	0
1	0	1

Q8) a) Compare time domain and frequency domain image enhancement. **[5]**

b) Enlist boundry descriptors and explain any one with suitable example. **[5]**

eee

Total No. of Questions :8]

SEAT No. :

P3106

[Total No. of Pages :2

[4660]-1378

M.E. (Instrumentation & Control) (Biomedical Instrumentation)
COMMUNICATION PROTOCOLS FOR INSTRUMENTATION
(2012 Course) (Semester - II) (506209)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Explain the characteristics of Sensor Networks and Device Networks. **[4]**

b) With neat sketches explain the topologies used in Fieldbus. **[4]**

c) Explain the RS232 communication waveform. **[2]**

Q2) a) Explain the Profibus DP network elements. **[4]**

b) What are Virtual Communication Relationships in Fieldbus? List the types. **[4]**

c) Explain the following network blocks: **[2]**

i) Routers

ii) Gateways

Q3) a) Explain the following test procedures done during commissioning of Fieldbus devices. **[4]**

i) Segment testing

ii) Field Device testing

b) Explain the Token passing Bus Arbitration Method. **[4]**

c) Draw a neat diagram of OSI reference model. **[2]**

P.T.O.

Q4) a) What is the ZWave Protocol? Explain its applications in brief. **[5]**

b) In short explain the MODBUS RTU protocol. **[3]**

c) List and explain the variants of Fieldbus. **[2]**

Q5) a) Explain the Resource block, Transducer block and function block in Fieldbus devices. **[5]**

b) Explain the Blutooth Protocol with respect to the mapping on OSI layer. **[3]**

c) Draw the query and response structure in MODBUS. **[2]**

Q6) a) Explain the hierarchical communication model in Process Automation. Also discuss the Network requirements at different levels. **[4]**

b) Compare Foundation fieldbus H1, Profibus PA with respect to Communication speed and Maximum number of stations. **[4]**

c) List the advantages of RS485. **[2]**

Q7) Write short notes:

a) Ethernet **[5]**

b) Commisioning of HART devices **[5]**

Q8) Write short notes:

a) Application of fieldbus in Hazardous and Non Hazardous area. **[5]**

b) Advantages and limitations of Open Networks. **[5]**

EEE

Total No. of Questions :8]

SEAT No. :

P3107

[Total No. of Pages :2

[4660]-1380

M.E. (Biomedical Instrumentation)

MEDICAL IMAGING TECHNIQUES

(2013 Course) (Semester - III) (606201)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, electronic pocket calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) Draw electromagnetic spectrum and explain its different ranges. **[4]**

b) List and Discuss the factors that affect the intensity of Xray beam. **[4]**

c) What is the importance of K-characteristic Xrays in radiography? **[2]**

Q2) a) State image quality characteristics that affect visibility. **[4]**

b) Draw xray emission spectrum for tungsten. **[4]**

c) Define Half Value layer. **[2]**

Q3) a) Compare fluroscopy and radiography. **[5]**

b) Define Contrast. Explain Gray scale of contrast. **[3]**

c) What are the thermal effects of ultrasound? **[2]**

Q4) a) Compare Bremsstrahlung and Characteristic Xrays. **[5]**

b) How mechanical matching is done in Ultrasound transducers. **[3]**

c) Why guidewire is used for arterial access of catheters in Angiography? **[2]**

P.T.O.

Q5) a) Discuss the requirement of compression in Mammography. **[4]**

b) Define Hounsfield number. Specify the values of HU for different body elements. **[4]**

c) What should be the focal spot size of Mammography Xray tube and how it is achieved? **[2]**

Q6) a) Explain why Thermography can detect cancer in early stage. **[4]**

b) Define FID, T1 and T2 and what is the importance of them in Magnetic Resonance Imaging. **[4]**

c) List different types of detectors used in radionuclide imaging. **[2]**

Q7) a) Define Optical Density. Elaborate the concept for radioopaque and radioluscent materials. **[5]**

b) Draw and explain the block diagram of A mode ultrasound scanner. **[5]**

Q8) a) What is the role of Image Intensifier in Fluroscopy. Describe its working with the help of a block diagram. **[5]**

b) Describe pulsed Doppler flowmeter with the help of a neat block diagram. **[5]**

EEE

Total No. of Questions : 8]

SEAT No. :

P3108

[Total No. of Pages : 2

[4660] - 1381

M.E. (Instrumentation and Control) (Biomedical Instrumentation)
ADVANCED DIGITAL SIGNAL PROCESSING
(2013 Credit Pattern) (Semester - III) (606202)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Solve any 5 questions.***
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, and electronic pocket calculator and steam table is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Compare Short Time Fourier Transform and Wavelet Transform. **[4]**

b) Explain Time frequency distribution with suitable example. **[4]**

c) Define Wigner Ville Distribution. State its properties. **[2]**

Q2) a) Explain imaging and aliasing in multi rate signal processing. **[3]**

b) Obtain the 4-components polyphase decomposition of the FIR filter of the length 9. **[5]**

c) Discuss the need of multi rate signal processing with suitable applications. **[2]**

Q3) a) What is the need of power spectral estimation? State methods of PSD estimation. **[2]**

b) Consider the signal $x(n) = a^n u(n)$, $0 < a < 1$. **[5]**

Determine the spectrum of the signal $x(n)$ and spectrum of the decimated signal of $x(n)$ by the factor of 2.

c) Explain periodogramm based power spectral estimation. State its applications. **[3]**

P.T.O.

Q4) a) List various applications of adaptive filtering. Explain any one. **[3]**

b) Compare least mean squares and recursive least squares adaptive algorithms. **[4]**

c) Explain properties of complex cepstrum. **[3]**

Q5) a) Explain the nature of output of LTI systems when driven by WSS signals. **[4]**

b) Discuss the models of stochastic processes. **[3]**

c) Why we need spectral factorization? Explain spectral factorization. **[3]**

Q6) a) Discuss need of data compression in signal processing with suitable examples. **[3]**

b) Discuss international standards for data compression. **[3]**

c) Explain JPEG standard of image compression. **[4]**

Q7) a) Discuss international standards for digital data broadcasting. **[3]**

b) Explain homomorphic system for Discrete time Fourier transform. **[4]**

c) Explain up sampling with suitable example. **[3]**

Q8) a) Explain Short time Fourier transform and its properties. **[4]**

b) Explain Yule Walker equation and its solution. **[4]**

c) Define SSS and WSS signals. **[2]**

☼ ☼ ☼

Total No. of Questions : 8]

SEAT No. :

P3045

[Total No. of Pages : 4

[4660]-1383
M.E. (Polymer)
MATHEMATICAL AND STATISTICAL METHODS
(509115) (2012 Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Use Gauss - Seidel method to solve the system of equations: **[5]**

$$10x_1 + x_2 + x_3 = 12$$

$$2x_1 + 10x_2 + x_3 = 13$$

$$2x_1 + 2x_2 + 10x_3 = 14$$

Find the solution at the end of fourth iteration.

b) Use power method to determine the largest eigen value and the corresponding eigen vector of the following matrix A. **[5]**

$$A = \begin{bmatrix} 10 & -2 & 1 \\ -2 & 10 & -2 \\ 1 & -2 & 10 \end{bmatrix}$$

Choose initial vector $\bar{X} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$.

Q2) a) Find z-transforms of the following (Any Two): **[6]**

i) $k5^k$, $k \geq 0$

P.T.O.

ii) $\sin\left(\frac{k\pi}{4}+\alpha\right)$, $k \geq 0$, α is constant.

iii) $\frac{2^k}{k}$, $k \geq 1$

b) Find inverse z-transform of the following (Any One): **[4]**

i) $\frac{1}{\left(z-\frac{1}{2}\right)\left(z-\frac{1}{3}\right)}$, $\frac{1}{3}<|z|<\frac{1}{2}$.

ii) $\frac{10z}{(z-1)(z-2)}$ using inversion integral method.

Q3) a) Solve the difference equation: **[5]**

$f(k+2)+3f(k+1)+2f(k)=0,\ k \geq 0$

Given $f(0)=0, f(1)=1$

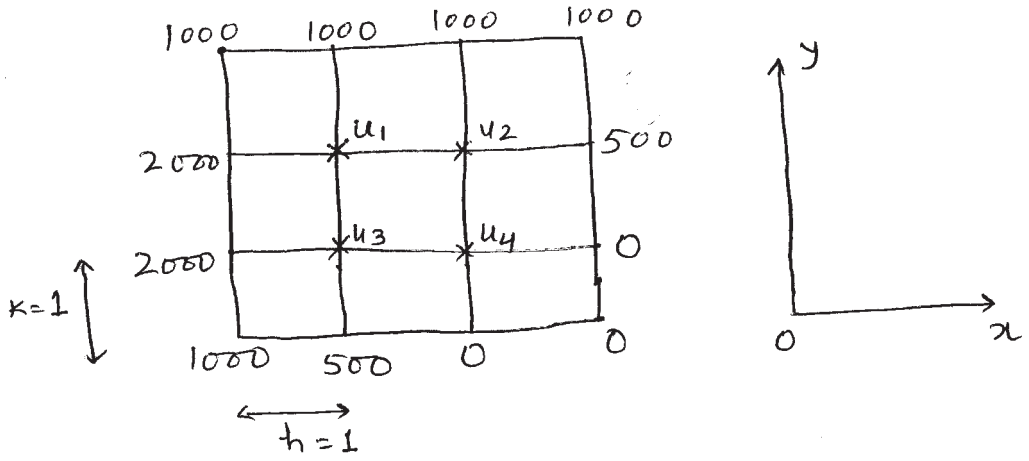
b) Evaluate **[5]**

$\int_0^1 e^{-x^2}dx$ using Gauss - Quadrature two point formula.

Q4) a) Solve the equation to find y at $x = 1.2$. $\frac{dy}{dx}=x^2+y^2,\ y(1)=1.5,\ h=0.1$.
Use Runge-Kutta fourth order method. **[5]**

b) Given the values of $u(x, y)$ on the boundary of the square given below. Evaluate the function $u(x, y)$ at nodal points 1, 2, 3 and 4 where $u(x, y)$ satisfies the equation **[5]**

$\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0,\ h=k=1.$



Q5) a) Using the finite difference method, solve the boundary value problem

$$x^2y'' + (x-2)\,y' - 3y = 10x$$

Given $y(0) = 0$, $y(1) = 100$, $h = 0.2$. **[5]**

b) Explain Crank-Nicolson Implicit finite difference method to solve one dimensional heat flow equation. Discuss the stability of the method. **[5]**

Q6) a) Find the curves on which the functional $\int_0^1 \left[\left(\frac{dy}{dx}\right)^2 + 12xy\right] dx$ with $y(0) = 0$ and $y(1) = 1$ can be extremised. **[5]**

b) Use Rayleigh - Ritz method to solve **[5]**

$$y'' - y + x = 0 \quad (0 \le x \le 1),\ y(0) = 0 = y(1).$$

Q7) a) Reduce the following matrix into tridiagonal form using Householder's method: $A = \begin{bmatrix} 1 & 4 & 3 \\ 4 & 1 & 2 \\ 3 & 2 & 1 \end{bmatrix}$. **[5]**

b) Use LU decomposition method to solve following system of equations: **[5]**

$$3x_1 + x_2 + x_3 = 4$$
$$x_1 + 2x_2 + 2x_3 = 3$$
$$2x_1 + x_2 + 3x_3 = 4$$

Q8) a) The demand for a particular spare part in a factory was found to vary from day to day. In a sample study following information was obtained: **[5]**

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Number of parts demanded	1124	1125	1110	1120	1126	1115

Test the hypothesis that the number of parts demanded does not depend on the day of the week.

Given $\chi^2_{5:0.05} = 11.07$.

b) The mean life time of a sample of 100 light bulbs produced by the company is computed to be 1570 hours and standard deviation of 120 hours. The company claims that the average life of the bulbs produced by it is 1600 hours. Is the claim acceptable? Given at 5% level of significance $t = 1.96$. **[5]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3240

[Total No. of Pages : 2

[4660] - 1385

M.E. (Polymer Engineering)

ADVANCED POLYMER TECHNOLOGY

(2013 Credit Pattern) (Semester - I) (509117)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
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 logarithmic tables, slide rule, electronic pocket calculator is allowed.***

Q1) a) Derive the necessary expression for Entropy of mixing using the Lattice Model. **[4]**

b) Explain with applicable diagrams the Phase Separation in polymer solution. **[3]**

c) Discuss the term Non-combinatorial and combinatorial Free Energy. **[3]**

Q2) a) Write a note on Statistics of Linear polycondensation and Chain polymerization. **[5]**

b) Explain the term "monomer reactivity ratios" and its importance. **[3]**

c) Explain the term "Solubility parameter". **[2]**

Q3) a) Explain with one example Metathesis Polymerization. **[5]**

b) Explain in detail Living Radical Polymerization. **[5]**

P.T.O.

Q4) a) Explain Polymeric Hydrogels with two examples. **[5]**

b) Write a note on: **[5]**

i) Photoconductive Polymers

ii) Light Sensitive Polymers

Q5) a) Explain in detail with two examples polymers used for high temperature composites applications. **[4]**

b) Write a note on Fire Resistant Polymers. **[3]**

c) What are the properties and applications of acrylic rubbers? **[3]**

Q6) a) Explain the structure, properties and applications of Fluroelastomers. **[5]**

b) Write a note on Ion Exchange Resin. **[3]**

c) Explain with one example Polymer Electrolytes. **[2]**

Q7) a) Explain with examples polymers from Renewable Resources. **[5]**

b) Write a note on''Graft Copolymerization''. **[5]**

Q8) a) Discuss in detail ''Self assembled polymers''. **[5]**

b) Write a note on ''Surface Functionalization of polymers''. **[5]**

☼ ☼ ☼

Total No. of Questions : 8]

SEAT No. :

P3241

[Total No. of Pages : 3

[4660]-1386
M.E. (Polymer Engineering)
RESEARCH METHODOLOGY
(509118) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
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.***
6) ***Students are permitted to use standard statistical tables having normal distribution area, F-test data, χ^2 test data etc.***

Q1) a) Write a note on "Various Steps used in Research process". **[4]**

b) Explain various objectives of research. **[3]**

c) Discuss in brief various types of research. **[3]**

Q2) a) Explain different objectives of review of literature in the research work. **[4]**

b) Explain in detail fundamental ethical principles used in research. **[3]**

c) Differentiate between Action Research and Fundamental Research. **[3]**

Q3) a) Discuss the assumptions on which Karl Pearson's coefficient of correlation is based. Discuss the merits and demerits and explain how to interpret the coefficient of correlation. **[4]**

b) A researcher obtained two regression equations while analysing research data. Comment whether you agree with him. **[4]**

$6X = 15Y + 21$

$21X + 14Y = 56$

c) Determine the sample size if Standard Deviation $\sigma = 6$, Population Mean = 25, Sample Mean = 23 and desired degree of Precision is 99%. **[2]**

Q4) a) Four types of tyres with different carbon black content are used in research by design of Latin squares. Four different types of cars, I, II, III and IV are used in the experiment.

Conditions of experiment: **[5]**

P.T.O.

i) Each car has one tyre of each of four types i.e. A, B, C, D.

ii) Each type of tyre is in positions Front left FL, Front right FR, Rear left RL and Rear right RR.

iii) Actual position of each of the 16 tyres has been chosen randomly.

iv) The wear out results after 8000 Km is tabulated below.

Car	Positions				
	FR	FL	RR	RL	Total
I	A31	B33	C47	D54	165
II	B36	D53	A42	C54	185
III	C51	A43	D62	B49	205
IV	D81	C78	B72	A84	315
Total	199	207	223	241	870

Using analysis of variance, draw conclusions about the wear based on the tyre type, tyre position and car type.

b) In a two factor, two level experiment involving a study of the effect of temperature and time on the percentage yield of the reaction, the results obtained were as below **[5]**

	Temperature (°C)		
Time	110	115	120
1 hr	5 and 6	9 and 7	10 and 11
2 hr	10 and 8	11 and 12	13 and 15

Draw conclusions.

Q5) a) Draw less than and more than Ogives from the data given below: **[4]**

Out of the injection moulding machines Kg/shift	No of machines
10-20	6
20-30	8
30-40	12
40-50	18
50-60	25
60-70	16
70-80	8
80-90	5
90-100	2

b) Write merits and demerits of pie chart and bar charts. **[2]**

c) Explain the following Tools of the Presentation of research data:

Frequency Distribution, Cumulative Frequency Distribution, Relative Frequency Distribution. **[4]**

Q6) a) Along with the significance, explain in detail the components of the technical report. **[4]**

b) Compare between Practical Report and Academic Report. **[3]**

c) Discuss in short "F-test or the variance ratio test". **[3]**

Q7) a) Write a note on "Genetic Algorithm". **[5]**

b) The following results give the conclusions of two sets of items subjected to two different treatments X and Y to increase tensile strength. **[3]**

Treatment X was applied to 400 items and 80 were found to have gained in tensile strength.

Treatment Y was applied to 400 items and 20 were found to have gained in tensile strength.

Is treatment Y superior to X?

c) What are the limitations on the use of χ^2 test. **[2]**

Q8) a) What are the types of Intellectual Property Rights (IPR)? Explain any two types. **[4]**

b) A company has developed a new technique to manufacture oil filters from non-woven polypropylene fibers. In order to protect this invention which type of IPR the company should prefer? Justify your answer. **[3]**

c) Explain with example the concept of Geographical Indications (GI). **[3]**

●●●●●

Total No. of Questions :8]

SEAT No. :

P3242

[Total No. of Pages :2

[4660]-1388

M.E. (Polymer Engineering)

POLYMER PROCESSING AND TESTING

(2013 Credit Course) (Semester - II) (509121)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
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 logarithmic tables, slide rule, electronic pocket calculator is allowed.***

Q1) a) Explain with neat diagram Devolatilization Extrusion process. **[4]**

b) Explain different principles of mixing used in processing. **[3]**

c) Discuss any four important additives in detail. **[3]**

Q2) a) Explain with neat sketch of Pipe Extrusion line using Vacuum Sizing. **[5]**

b) Explain Tubing Extrusion die equipped with internally cooled sizing mandrel. **[3]**

c) Explain the importance of Residence time Distribution in processing. **[2]**

Q3) a) Explain Parison Programming in detail. **[5]**

b) Explain in detail different Downstream Equipments and Auxiliary Units For Film extrusion Lines. **[5]**

Q4) a) Discuss in detail "Heat Transfer analysis in Thermoforming". **[4]**

b) Discuss different parameters which affect the thickness distribution of Thermoformed product. **[3]**

c) Discuss any one process for Decoration of polymers. **[3]**

P.T.O.

Q5) a) Explain in detail Creep and Stress relaxation test methods. **[4]**

b) Write a note on Different Types of Impact testing. **[3]**

c) Discuss different types of polymeric materials with applicable Tensile Stress-strain curves. **[3]**

Q6) a) Explain the importance of Preparations of test Samples and Conditioning in testing. **[3]**

b) Discuss different Non-destructive test methods with one example. **[4]**

c) Explain the importance of Fatigue test. **[3]**

Q7) a) Explain with examples different parameters which affect the electrical properties of polymers. **[4]**

b) Write a note on Arc resistance Measurement. **[3]**

c) Write a note on Surface and Volume Resistivity. **[3]**

Q8) a) Explain the importance of barrier Properties and discuss the applicable test method for the same. **[4]**

b) Write a note on "Weather Resistance test and its applications". **[3]**

c) Discuss different Fire Resistance test methods used for polymers. **[3]**

EEE

Total No. of Questions : 8]

SEAT No. :

P3243

[Total No. of Pages : 2

[4660]-1392
M.E. (Polymer Engineering)
POLYMER RHEOLOGY
(509127) (2013 Credit Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
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 logarithmic tables, slide rule, electronic pocket calculator is allowed.***

Q1) a) Explain with examples different types of Non-Newtonian Fluids. **[4]**

b) Explain different molecular bases of Stress Relaxation and Creep. **[3]**

c) Define and discuss the Deborah Number with one example. **[3]**

Q2) a) With help of neat diagram explain the dependence of Modulus-Temperature Behaviour of Polymers. **[5]**

b) A polymeric specimen sample measures 15mm in width and 3 mm thick fails at 310 Kg load. Original gauge length 50 mm. It elongates to a maximum length of 120 mm. Calculate the Tensile Strength and Percentage Elongation. **[2]**

c) Explain the term "Elastic effects in polymers". **[3]**

Q3) a) Derive an expression for the maxima of Ryan and Johnson stability parameter for a power law fluid. **[5]**

b) Explain in detail Boltzmann Superposition principle. **[5]**

Q4) a) Explain in detail Cone and Plate Viscometer. **[5]**

b) Discuss with applicable diagram Couette Viscometer. **[5]**

P.T.O.

Q5) a) Discuss effect of Temperature and Molecular Weight on Viscoelastic properties of polymers. **[5]**

b) Explain with suitable examples effect of Copolymerization and Cross linking on Viscoelastic properties of polymers. **[5]**

Q6) a) Write a note on "Principles of Rheology to Die Design". **[5]**

b) Write a short note on "Rheology of Immiscible Polymer Blends". **[5]**

Q7) a) Explain analysis of Creep and Stress Relaxation behavior for polymers following Zener viscoelastic model. **[4]**

b) Explain with suitable examples effect of different factors affecting the mechanical behavior of polymers. **[4]**

c) Discuss Ellis Fluid Flow analysis model. **[2]**

Q8) a) Write a short note on "Rheology of Composites". **[5]**

b) Explain the followings: **[3]**

i) Doi-Edwards Theory.

ii) Curtiss-Bird Theory.

c) Discuss "Rabinowitsch Correction Factor". **[2]**

●●●●●

Total No. of Questions : 8]

SEAT No. :

P3244

[Total No. of Pages : 2

[4660] - 1393

M.E. (Polymer Engineering)

TRANSPORT PHENOMENON IN POLYMERS

(2013 Credit Pattern) (Semester -III) (509128)

Time :3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions from the following.***
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 logarithmic tables, slide rule, electronic pocket calculator is allowed.***

Q1) a) Explain Curl of vector field with help of suitable mathematical expression and its usage in Transport Phenomena. **[5]**

b) Explain with necessary mathematical expressions the second order tensor. **[5]**

Q2) a) With help of neat diagram explain the deformation during polymer flow. **[4]**

b) Discuss the Cauchy's principles and its usage in polymer deformation. **[4]**

c) Explain Strain Tensors. **[2]**

Q3) a) Derive the Buckingham-Reiner equation for Bingham Plastic fluid flow in a circular tube. **[5]**

b) With help of neat diagram explain the importance of RTD in polymer mixing. **[2]**

c) Discuss the pressure drop calculation of Power-Law Fluid in Laminar Flow through a tube. **[3]**

P.T.O.

Q4) a) Derive the necessary expression for velocity profile of non-Newtonian fluids flowing through circular cross-section. **[5]**

b) Discuss with applicable diagram the dimensionless velocity profile for power law non-Newtonian fluids through a pipe. **[3]**

c) Discuss the power correlation in mixing for a non-Newtonian fluid. **[2]**

Q5) a) Define solubility coefficient and permeability coefficient. Explain effect of Temperature on the permeability coefficient. **[3]**

b) Derive the necessary expression of permeability for diffusion in polymeric film. **[3]**

c) Write a short note on controlled release through polymeric film and its practical applications. **[4]**

Q6) a) A polyethylene film of 0.15mm thick is being considered for used in packaging pharmaceutical product at 30°C. If the partial pressure of oxygen outside the package is 0.21 atm and inside it is 0.01 atm.

Calculate the diffusional flux of oxygen at steady state. Assume that the resistances to diffusion outside and inside of the film are negligible compared to the resistance of the film. **[3]**

Data: For polyethylene film: Diffusivity = 0.8×10^{-10} m^2/s and solubility is 0.052 (m^3 solute)/(m^3 solid. atm).

Assume that a film is made up of Nylon with Diffusivity = 0.06×10^{-10} m^2/s and solubility is 0.00052 (m^3 solute)/(m^3 solid. atm).

Justify which material you would prefer for the above packaging the pharmaceutical product.

b) Write a short note on Ion-Exchange Resin. **[3]**

c) Discuss the multi-component diffusion mechanism through polymeric film. **[4]**

Q7) a) Explain in details heat transport analysis with viscous dissipation. **[5]**

b) Highlight the importance of Brinkman Number. **[2]**

c) Explain the importance of viscous dissipation in polymer processing. **[3]**

Q8) a) Explain in details heat transport analysis with chemical reactions as a heat source. **[5]**

b) Explain with suitable examples the importance of heat and mass transport analysis in polymer processing. **[5]**

☼ ☼ ☼

Total No. of Questions : 3]

SEAT No. :

P3046

[Total No. of Pages : 2

[4660]-1395
M.E. (Printing)
PROBABILITY, STATISTICS & REGRESSION ANALYSIS
(508101) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer all the questions.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Use of Electronic pocket calculator is allowed.***
4) ***Assume suitable data if necessary.***

Q1) Attempt Any Three:

a) The probability mass function of a random variable x is zero except at the point $x = 0, 1, 2$. At these points it has values **[6]**

$P(0) = 3C^3$, $P(1) = 4C - 10C^2$ and $P(2) = 5C - 1$ for some $C > 0$.

i) Determine the value of C.

ii) Compute $P(x < 1)$, $P(x < 2)$, $P(1, x \leq 2)$, $P(0 < x < 3)$.

b) In a sample of 120 workers in a factory the mean and standard deviation of wages were Rs. 11.35 & Rs. 3.03 respectively. Find the percentage of workers getting wages between Rs. 9 and Rs. 17 in the whole factory assuming that the wages are normally distributed. **[6]**

c) The following results were obtained in the analysis of data on yield of a dry bark in ounces (Y) and ages in years (X) of 200 cinchona plants. **[6]**

	X	Y
Average	9.2	16.5
Standard Deviation	2.1	4.2

Correlation Coefficient of $\gamma = 0.84$.

Construct two lines of regression and estimate the yield of dry bark of a plant of 8 years of age.

d) A random sample of 10 boys has average IQ. **[6]**

X	1	2	3	4	5	6	7	8	9	10
Y	70	120	110	101	88	83	95	98	107	100

Does this data support the assumption of a population mean IQ of 100? Check for hypothesis? (t_9 at 5% = 2.262).

P.T.O.

Q2) Attempt any Two:

a) Table given below shows the number of defectives found in inspection of 10 lots of 100 items each. **[10]**

i) Determine control limits for P chart and state if the process is in control.

ii) If the point which goes outside the limit is analyzed and eliminated what will be the value of new control and revised fraction defectives.

Lot No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	6	3	1	4	3	0	11	5	2	3

b) The following are inspection results of 20 lots of magnets each lot having 750 magnets. The numbers of defective magnets in each lot are 48, 83, 70, 85, 45, 56, 48, 67, 37, 52, 47, 57, 71, 53, 34, 29 and 30. Calculate the average fraction defective and 3 sigma control limits for P chart. **[6]**

OR

c) Control charts for $\bar{X}$ and R are maintained for control chart of an important dimension of a component. The subgroup size is settled to 5.

The values of $\Sigma\bar{\bar{X}}$ and ΣR after 25 subgroups are found to be 614.8 and 120.0 respectively. Compute the values of 3 sigma limits for $\bar{X}$ charts and assume R = 2.3266. **[6]**

Q3) Attempt the following questions:

a) Explain various Statistical methods in improving quality for products & industries. **[6]**

b) Write short note on S/N Ratio (Signal to Noise ratio). **[4]**

c) Explain the concept of Loss of function. **[6]**

●●●●●

Total No. of Questions : 3]

SEAT No. :

P3048

[Total No. of Pages : 1

[4660]-1397
M.E. (Printing Engineering)
MODERN TRENDS IN PRINTING
(508103) (2013 Course) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Draw neat diagram wherever necessary.***
2) ***Figures to right indicate full marks.***

Q1) Explain in detail gravure unit configurations. **[18]**

OR

Explain in detail gravure cylinder making process. **[18]**

OR

Explain in detail optimization of 2.84 mm flexo photopolymer plate. **[18]**

OR

Explain in detail impact of shore hardness on printability. **[18]**

Q2) Explain the working and drawbacks of mechanical line shaft system. **[16]**

OR

Mention the pressurization systems for impression system. **[16]**

Q3) Mention care and maintenance to be undertaken for flexo plate-making. **[16]**

OR

Explain the effect of temperature and humidity on printability. **[16]**

●●●●●

Total No. of Questions : 3]

SEAT No. :

P3049

[Total No. of Pages : 1

[4660]-1398
M.E. (Printing Engineering)
RESEARCH METHODOLOGY
(508104) (2013 Credit Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer all the questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of Electronic pocket calculator is allowed.***
4) ***Assume suitable data if necessary.***

Q1) Attempt Any Three:

a) Explain Research and different types of Research. **[6]**

b) Explain what is literature review. What is importance of literature review in defining a research problem? **[6]**

c) Write about features of good design and important concepts related to research design. **[6]**

d) How is data collection done? What are data collection methods? **[6]**

Q2) a) What are elements involved in a scientific research report? Explain about each element. **[10]**

b) Explain the significance of Report Writing with an example and usefulness in the print industry. **[6]**

OR

c) Write about key points about a successful presentation. **[6]**

Q3) a) What is Intellectual property, patent and copyright act. **[6]**

b) Write short note on research proposal and what important points should be considered while writing a research proposal. **[10]**

OR

c) Explain various types of technical papers. **[10]**

●●●●●

Total No. of Questions :6]

SEAT No. :

P3379

[Total No. of Pages :1

[4660]-1400
M.E. (Printing)
COLOR SCIENCE
(2013 Credit pattern) (Semester - II) (508107)

Time : 2 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Explain with neat diagram human eye & vision. **[6]**

Q2) Explain CIE CAMOZ system in details. **[4]**

Q3) Differentiate between perceptability & acceptability. **[4]**

Q4) What is metamerisam. Explain. **[4]**

Q5) Explain following: **[16]**

a) ICC profile architecture

b) ICC profile types

Q6) With respect to color matching on different substrates explain following: **[16]**

a) Optical properties of materials.

b) Color due to scattering.

ℰℰℰ

Total No. of Questions :3]

SEAT No. :

P3050

[Total No. of Pages :1

[4660]-1401

M.E. (Printing Engineering & Graphic Communication)

WEB HANDLING ON PRESS

(2013 Credit Pattern) (Semester - II) (508108)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Draw neat diagram wherever necessary.***
2) ***Figures to the right indicate full marks.***

Q1) Explain the systems incorporated to check the defects on web. **[18]**

OR

Explain in detail treatments given on the surface of a film. **[18]**

OR

Explain in detail tension control system of a press. **[18]**

OR

Explain in detail registration on a web press. **[18]**

Q2) Explain the effect of imbalance of rollers on web press. **[16]**

OR

Explain in detail systems used to guide the web. **[16]**

Q3) Explain the role of transport rollers in a press. **[16]**

OR

Write notes on: **[16]**

a) Idler Roller Specification

b) Covering of Idler Rollers

ɛɛɛ

Total No. of Questions :3]

SEAT No. :

P3051

[Total No. of Pages :1

[4660]-1402

M.E. (Printing Engineering & Graphic Communication)

SUBSTRATE AND INK

(2013 Credit Pattern) (Semester - II) (508109)

Time : 2 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain Chemical pulping in detail. **[6]**

c) Discuss any two surface properties of paper and testing methods. **[6]**

c) Give typical formulation of water based Flexo ink. **[6]**

Q2) Calculate paper required for printing 1500 copies of leaflet of size 8 inches * 11 inches on offset machine. **[16]**

Q3) Write notes on (any two): **[16]**

a) VOC and its significance in printing inks.

b) Sustainability and Waste management.

c) Quality control for substrance & Ink.

EEE

Total No. of Questions :3]

SEAT No. :

P3052

[Total No. of Pages :1

[4660]-1404

M.E. (Printing Engineering & Graphic Communication)

PRINTED ELECTRONICS AND RFID

(2013 Credit Pattern) (Semester - III) (608101)

Time : 2 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Assume suitable data wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) What is Printed Electronics? **[6]**

b) Explain the types of substrates used for Printed Electronics. **[6]**

c) Comment on materials used for manufacturing different functional inks needed for printed electronics. **[6]**

Q2) What is RFID? Discuss RFID tagging and replacement of barcode in supply chain management. **[16]**

Q3) Write note on different application of Organic Electronics. **[16]**

ℰℰℰ

Total No. of Questions :3]

SEAT No. :

P3053

[Total No. of Pages :1

[4660]-1405

M.E. (Printing Engineering & Graphic Communication)
ADVANCES IN CONVERTING AND PACKAGING
(2013 Credit Pattern) (Elective - IV) (Semester - III) (608102)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Draw neat diagram wherever necessary.***
2) ***Figures to the right indicate full marks.***

Q1) Explain in detail finishing operations for a package. **[18]**

OR

Explain in detail Coating and Varnishing process. **[18]**

OR

Explain along with diagram various Lamination techniques. **[18]**

OR

Explain in detail Extrusion process. **[18]**

Q2) Explain in detail Bag-in-Box for solid products. **[16]**

OR

Explain in detail different types of pouches in packaging. **[16]**

Q3) Explain in detail Aseptic Packaging. **[16]**

OR

Explain in detail Retort packaging. **[16]**

EEE

Total No. of Questions : 4]

SEAT No. : ____

P3129

[Total No. of Pages : 1

[4666] - 307

M.C.A. (Commerce) (Semester - III)

MANAGEMENT INFORMATION SYSTEM

(2013 Pattern) (Credit System)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw a neat lable diagram whenever necessary.***

Q1) Attempt Any two : **[2 × 7 = 14]**

a) How quality of information improves the knowledge and decision making capability of people. Explain.

b) What is MIS? Explain MIS and DSS.

c) Explain OOSAD development Life cycle.

Q2) Attempt following (Any two) : **[2 × 6 = 12]**

a) Explain MIS development process model in details.

b) Explain use of object oriented Technology.

c) What is Decision making? Explain D.M. process.

Q3) Attempt the following (Any two) : **[2 × 6 = 12]**

a) Explain role and importance of MIS.

b) What is organisation? Explain different types.

c) What is system? Explain types and classes of system.

Q4) Attempt the following (Any two) : **[2 × 6 = 12]**

a) Explain OOSAD methodology in details.

b) Explain MIS and system Analysis.

c) What is information? Explain classification of information.

⌘⌘⌘