Subject Code: G0504/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

OPERATING SYSTEMS

(Common to CS and CS&E)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) What is an operating system? Explain the operating system services
   b) What is a system call? Explain different types of system calls

2. What is a process? Explain different process scheduling algorithms with example

3. a) Explain short, medium and long term schedulers with the help of state diagram
   b) What is thread? Describe User level and kernel level threads

4. Explain the following with example
   a) Processes synchronization
   b) Critical section problem
   c) Semaphores

5. a) What is dead lock? Explain necessary conditions to exist deadlock
   b) Apply the deadlock detection algorithm to the following data and show the results
   Available = (2 1 0 0)

   Request = $\begin{pmatrix} 2 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{pmatrix}$, Allocation = $\begin{pmatrix} 0 & 0 & 1 & 0 \\ 2 & 0 & 0 & 1 \\ 0 & 1 & 2 & 0 \end{pmatrix}$

6. a) What is virtual memory? Explain address translation in a paging system
   b) What is page replacement? Explain Optimal page replacement algorithm with suitable example

7. a) Explain different memory management techniques
   b) Explain the First fit, Best- fit, and Worst-fit in detail

8. a) What is a File? Explain the file system architecture with diagram
   b) Explain the importance of Cryptography for protection and security of data

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Subject Code: G1501/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

COMPUTATIONAL METHODS IN ENGINEERING

(Common to MD, MED, CAD/CAM and TS&ES)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. Solve the following system of equations by using Gauss Elimination Method

$4x_1 + x_2 + x_3 = 2$

$x_1 + 5x_2 + 2x_3 = -6$

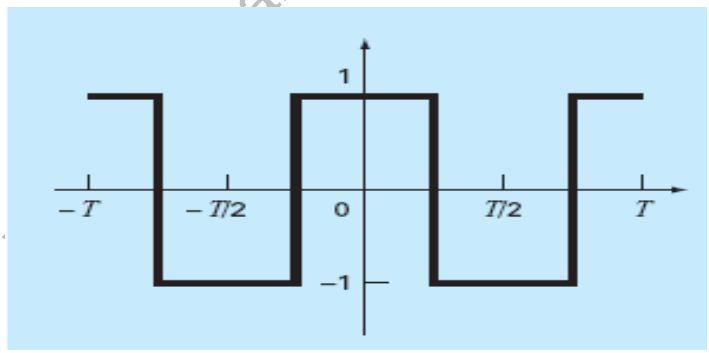
$x_1 + 2x_2 + 3x_3 = -4$

2. Use nonlinear regression to fit a parabola to the following data:

x	0.2	0.5	0.8	1.2	1.7	2	2.3
y	500	700	1000	1200	2200	2650	3750

3. Find the temperature distribution in the wall which is 1m width. One side of the wall is having 200^0C and the other side is insulated. Given Q = 400 W/m^3 and K_{xx} = 25 W/m^{o}C. Use Rayleigh – Ritz method.

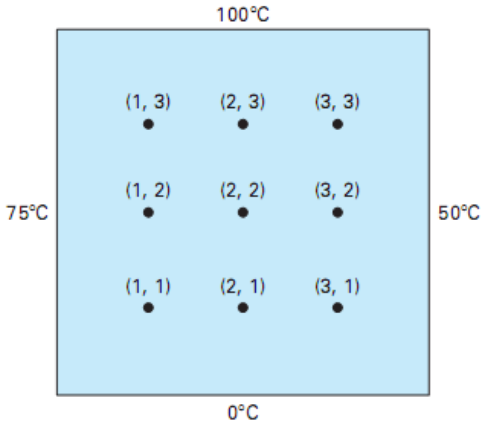
4. Use the continuous Fourier series to approximate the square or rectangular wave function given below with a time period $T = 2\pi/\omega_0$.



5. Solve $u_{xx} = u_{tt}$ up to t = 0.5 with a spacing of 0.1 subject to y(0,t) = 0, y(1,t) = 0, y_t (x,0) = 0 and y(x,0) = 10 + x(1-x).

Subject Code: G1501/R13

6. Use the ADI method to solve for the temperature of the 40 × 40-cm plate as shown below with a grid spacing of 10 cm. Employ a time step of 10 sec. The coefficient of thermal diffusivity is $k = 0.835$ cm^2/s.



7. Solve $u_{xx} = u_{tt}$ Given $u(0,t) = 0$, $u(4,t) = 0$, $u_t(x,0) = 0$ and $u(x,0) = 2\sin\pi x$.

8. Using method of characteristics, solve $u_{xx} = 4u^2 u_{tt}$ at two characteristic grid points between
x = 0.2, 0.3 and 0.4, t > 0 where $u = 0.2 + 5x^2$, $u_t = 3x$ along t = 0, x lies between 0 and 1.

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Subject Code: G2106/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

REFRIGERATION AND AIR CONDITIONING

(Thermal Engineering)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Explain the working principle of vapour compression refrigeration system with a neat diagram and also plot the same on a P-h and T-s diagram. Derive the expression for COP
   b) An ammonia refrigerator works between -6.7^{0}C and 26^{0}C. The vapour is dry and saturated at the end of compression. Calculate i) theoretical COP ii) power required to drive the compressor if the cooling capacity of the refrigerator is 5 tons. The properties of NH_3 are

Temp (^{0}C)	Specific Enthalpy (kJ/kg)		Specific Entropy (kJ/kg-k)	
	Liquid (h_f)	Sat. vapour (h_g)	Liquid (s_f)	Sat. vapour (s_g)
-6.7	-29.26	1262.36	0.1087	4.7401
26.7	124.56	1291.62	0.4264	4.3263

2. a) With a neat sketch explain the working of thermostatic expansion valve.
   b) Explain the working of compound compression with inter-cooling. Discuss why it is considered as an effective method of operation.

3. a) derive the expression for optimum coupling temperature of the cascade system on the basis of Carnot COP and Schmidt analysis.
   b) With a neat sketch explain the working of three fluid system.

4. a) A Bell-Coleman refrigeration cycle works between 1 bar and 6 bar. The adiabatic efficiency of compression is 90% and expansion is 95%. Find the COP of the system and its tonnage when the air flow rate is 2 kg/sec. The ambient temperature is 25^{0}C and refrigerator temperature is -5^{0}C
   b) Explain the working of simple air evaporative cooling system used for air crafts? write the advantages of dense air refrigeration system over an open air refrigerating system?

5. a) Explain the working of steam jet refrigeration system and write the advantages and disadvantages of it.
   b) Explain the working of thermo electric refrigeration system with the help of a schematic layout.

6. a) 1100 m^3 of air per minute at 250 C DBT and 45% R.H. is supplied to an auditorium. The condition of the atmospheric air is 35^0 C DBT and 65% R.H. The required condition is achieved first by cooling and dehumidifying and then by heating. Find the cooling capacity required in tons of refrigeration and heating capacity required in kW. Take air pressure as 1.03 bar.

Subject Code: G2106/R13

6. b) Define the term "effective temperature" and explain its importance in air- conditioning systems. Describe the factors which affect the effective temperature.

7. a) A library hall is maintained at 24^0C DBT and 50% R.H. when ambient conditions are 38^0 DBT and 40% RH. The room sensible and latent heat gains are 125000kJ/hr and 68000kj/hr respectively. The ventilation is 65 mm^3/min. find the following.
   i) Grand total heat, ii) Effective sensible heat, iii) ADP temperature,
   iv) Dehumidified air quantity. Take B.F (for coil) = 0.1.
   b) Explain about duct arrangement systems.

8. Explain the following.
   a) Properties of ideal refrigerants
   b) Vortex tube
   c) Psychrometric chart

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Subject Code: G2206/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

PROJECT MANAGEMENT

(Common to TE and HE)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. (a) Distinguish between mission, vision and objectives. Explain the importance of these components in an organization.
   (b) Who constitutes construction team in construction industry? Any two examples maybe cited?

2. (a) Explain the methods of project cost forecasting and write any two examples?
   (b) What are the stages involved in project planning and implementation?

3. (a) What are the important conditions of contract included in contract documents?
   (b) Explain the difficulties faced in capital expenditure decision.
   (c) What is the basic difference between PERT and CPM?

4. The following is list of activities of a project with their start and finish nodes and durations. The project network proceeds from node 1 to node 10.
   (a) Calculate the earliest expected times and the latest allowable times for all the events
   (b) Determine the critical path(s) of the network

Work Activity	Start node	Finish node	Estimated time (days)
A	1	2	2
B	1	3	3
C	1	4	3
D	2	5	3
E	2	9	3
F	3	5	1
G	3	6	2
H	3	7	3
I	4	7	5
J	4	8	3
K	5	6	3
L	6	9	4
M	7	9	4
N	8	9	3
O	9	10	2

Subject Code: G2206/R13

5. (a) Explain the scope of human resource management. Discuss in detail about the recruitment and selection stages involved for a selection of manager for a construction sector
   (b) Explain in detail the project implementation strategies?

6. (a) What are the importance of planning and scheduling in construction industry?
   (b) What do you understand by NPV method? State the project is feasible or not by NPV method if project cost is Rs. 200000 has cash flow of Rs. 30000 for a period 5 years. Firm expects returns at 10% per annum.

7. (a) Explain the special features of international contracts related to quality management and safety in construction Industry
   (b) Write a short note on
      i) Control charts
      ii) Value engineering
      iii) Life cycle cost

8. (a) Define feasible region in linear programming. State its application in construction projects?
   b) The following table lists the jobs of a project with their time estimates:

Job	to	tm	tp	(in Days)
A	2	5	14	
B	9	12	15	
C	5	14	17	
D	2	5	8	
E	6	9	12	
F	8	17	20	

Draw the PERT network and determine the expected project completion time.

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Subject Code: G5605/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

ELECTRICAL DISTRIBUTION SYSTEMS

(Common to PS, PSC&A, EPE, EPS and APS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. (a) Explain the various factors affecting the distribution system planning.
   (b) Write in detail about Residential and industrial loads and their respective characteristics.

2. (a) Examine the present trend for the future distribution system planning.
   (b) Explain the following:
   (i) coincidence factor
   (ii) contribution factor
   (iii) loss factor

3. (a) Draw single line diagram of radial type primary feeder and mention factors that influences selection of primary feeder.
   (b) Discuss the benefits derived through optimal location of substations.

4. (a) What are the differences between primary and secondary distribution system.
   (b) What are the various factors that influence the voltage levels in the design and operation of the distribution system?

5. (a) In terms of resistance and reactance of the circuit, derive the equation for load power factor for which voltage drop is minimum.
   (b) Assume that feeder has a length of 2 miles and that the new feeder uniform loading has increased to 3 times the old feeder loading. Determine the new maximum length of the feeder with the same percent voltage drop if the new feeder voltage level is increased to 34.5 kV from the previous voltage level of 12.47 kV.

6. (a) Derive equation for the calculation of fault current for line to line fault and three phase fault.
   (b) Discuss the objectives of objectives of distribution system protection.

7. (a) Discuss the general coordination procedure of various protective devices.
   (b) Explain the principle of operation of fuses and circuit reclosers.

8. (a) How an AVR can control voltage? With the aid of suitable diagram explain its function.
   (b) With the help of a phasor diagram, show how a series capacitor boosts the voltage? What are the drawbacks of this method?

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Subject Code: G6809/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

CMOS DIGITAL IC DESIGN

(Common to VLSI & ES, ES & VLSI, VLSID & ES, ES & VLSID, VLSI, VLSID, VLSISD and VLSI&ME)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Draw the Pseudo NMOS logic diagram and explain its operation in detail.
   b) Derive the simple MOS large signal model and explain its operation.

2. a) With neat sketches, explain the transfer characteristic of a CMOS inverter.
   b) Design an inverter using
      (i) NMOS;
      (ii) CMOS and
      (iii) Pseudo NMOS. Compare and explain the characteristics of above designs.

3. a) Design a dynamic AND-OR-INVERT circuit, and comment on charge sharing issues in the circuit?
   b) Draw the circuit of a dynamic 3-input NOR gate and explain its working?

4. a) Design a carry look ahead adder with Multi Output Domino Logic?
   b) What are the of NORA logic?

5. a) Draw the D latch by using CMOS logic and explain its operation in detail.
   b) Write short notes SR latch in sequential MOS logic

6. a) Explain Briefly about RAM array organization.
   b) Explain the concept of Leakage currents in DRAM cell and how it can be overcome .

7. a) Draw and explain the operation of a single bit dynamic RAM cell.
   b) Draw the clock generation circuit of CMOS and explain the operation of the same with an example.

8. a) Explain the concept of charge storage and charge leakage associated with pass transistor logic.
   b) Explain the term “Scaling” related to MOS circuits.

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Subject Code: G6810/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

NETWORK SECURITY AND CRYPTOGRAPHY

(Common to VLSI & ES, ES & VLSI, VLSID & ES, ES & VLSID, DS&CE, ES, S&SP, DIP, CE&SP, IP, C&SP, SP&C and SP&C and CS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1 a) what is network security? Explain the X.800 security services
b) Explain Hill Cipher (6+6)

2 a) What is Cryptanalysis? Explain differential and Linear Cryptanalysis
b) Explain block cipher modes of operations (4+8)

3 a) List and explain the characteristics of advanced symmetric block ciphers
b) Explain the Blowfish algorithm (4+8)

4 a) State and prove Fermat's and Euler's theorems
b) Using Fermat's theorem, find 3^{201} mod 11
c) Explain Euclid's algorithm (6+3+3)

5 a) what are the HMAC Design objectives? Explain the HMAC algorithm
b) Explain the advantages of S/MIME over SMTP (8+4)

6 a) Explain the architecture of IP security
b) What is Web security? Explain SSL protocol (4+8)

7 a) Define intruder? Explain Anderson's identified classes of intruders
b) List and explain threats of malicious programs
c) What is a Firewall? Explain its capabilities and limitations (4+4+4)

8 Explain the following
a) Triple DES
b) X.509 directory services
c) Oakley key determination protocol (4+4+4)

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Subject Code: G8704/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

EXPERIMENTAL STRESS ANALYSIS

(Common to SE and SD)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. (a) Explain the properties of Optical strain gauge systems?
   (b) Write the details of scale factors related to strain measurements?

2. (a) Explain the performance characteristics of wire and foil strain gauges
   (b) Explain the details of correction required for transverse sensitivity?

3. (a) State the objectives of non destructive testing methods?
   (b) Explain how the concrete quality is assessed by using Acoustic Emission Technique?

4. (a) Define photo-elasticity? State the principles with reference to two-dimensional photo-elasticity and a fringe pattern revealed due to optical interference?
   (b) Describe the basic elements of a plane polariscope?

5. (a) Write the basic properties of photo-elastic materials? Also stet their relevance to measurement type?
   (b) Write any five applications isoclinic fringe data is useful?

6. (a) Describe the Wheatstone Bride circuit with provision for balancing the bridge and also with unbalanced bride strain gauge measurement?
   (b) Explain the separation techniques that are applicable to isoclinics and isochromatic fringe?

7. (a) Explain the six steps of strain gauge selection process?
   (b) Explain the following techniques of Ultrasonic Pulse Velocity Testing with sketches:
   (i) Direct Transmission
   (ii) Semi-direct Transmission and
   (iii) Indirect Transmission

8. (a) Write the comparison between acoustic emission and concrete resistance meter methods of NDT testing methods of concrete?
   (b) Explain the properties of Pneumatic strain gauge systems?

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Subject Code: G8705/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016

SUB-STRUCTURE DESIGN

(Common to SE and SD)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. (a) Write a short note on Geophysical exploration using electrical resistivity.
   (b) Explain and discuss the various factors that help to decide the number and depth of bore holes required for subsoil exploration.

2. (a) Why are undisturbed samples required? Describe any one procedure of obtaining undisturbed samples for a multi-storeyed building project.
   (b) Write down the design considerations of open drive sampler.

3. (a) Discuss the various factors that affect the bearing capacity of a shallow footing. Write brief critical notes on settlement of foundations. How do you ascertain whether a foundation soil is likely to fail in local shear or in general shear ?
   (b) What is the ultimate bearing capacity of a rectangular footing, 1.75 × 3.50 m, at a depth of 1.5 m in a soil for which c = 30 kN/m^2, φ = 15°, and γ = 18 kN/m^3. Brinch Hansen's factors are N_c = 10.89, N_q = 3.94, and $N\gamma$ = 1.42. The water table is deep. The vertical load is 1500 kN and the horizontal load is 150 kN at the base of the footing. Determine also the factor of safety.

4. A square foundation of 1.5 m X 1.5 m in size at a depth of 1.5 m, with eccentricity along one direction is e_L = 0.3 m and other direction is e_B = 0.15m. Determine the ultimate load, Q_{ult}.
   The properties of the foundation soil are: unit weight of the soil, γ = 18 kN/m^3, c^1 = 0 and ϕ = 30^0. Use Meyerhof Theory.
   Data required for computation: ϕ = 30^0 ---→ N_q = 30.13, N_q = 18.5 and N_γ = 15.7
   Shape factors $S_c = 1 + 0.2k_p \frac{B}{L}$ $S_q = S_\gamma = 1 + 0.1k_p \frac{B}{L}$ where $k_p = \tan^2(45 + \phi/2)$
   Depth factors $d_c = 1 + 0.2\sqrt{k_p}\frac{D}{B}$ and $d_q = d_\gamma = 1 + 0.1\sqrt{k_p}\frac{D}{B}$ and
   Inclination factors $i_c = i_q = \left(1 - \frac{\theta}{90}\right)^2$ and $i_\gamma = \left(1 - \frac{\theta}{\phi}\right)^2$

5. (a) What are the factors to be considered while locating a new footing adjacent to the existing footing?

Subject Code: G8705/R13

5. b) Proportion a combined trapezoidal footing given the following conditions?

	Column 1	Column 2
Dead Load	750 kN	480 kN
Live Load	400 kN	300 kN
Size of the Column	500 x 500 mm	400 x 400 mm

6. (a) Describe the procedure for the estimation of settlement of a pile group by considering the only bearing resistance of the pile group.

(b) A reinforced concrete pile of 40 cm diameter and 25 m long is driven through medium dense sand to a final set of 2.5 mm, using a 40 kN single - acting hammer with a stroke of 150 cm. Determine the ultimate driving resistance of the pile if it is fitted with a helmet, plastic dolly and 50 mm packing on the top of the pile. The weight of the helmet, with dolly is 4.5 kN. The other particulars are: weight of pile = 85 kN, weight of hammer 35 kN; pile hammer efficiency $T_{J\,h}$ = 0.85; the coefficient restitution C_r = 0.45. Use Hiley's formula. The sum of elastic compression C = $c_1 + c_2 + c_3$ = 20.1 mm.

7. (a) What is the basis on which the dynamic formulae are derived ? Mention two well known dynamic formulae and explain the symbols involved

(b) Nine RCC piles of diameter 30 cm each are driven in a square pattern at 90 cm center to center to a depth of 12 m into a stratum of loose to medium dense sand. The bottom of the pile cap embedding all the piles rests at a depth of 1.5 m below the ground surface. At a depth of 15 m lies a clay stratum of thickness 3 m and below which lies sandy strata. The liquid limit of the clay is 45%. The saturated unit weights of sand and clay are 18.5 kN/m^3 and 19.5 kN/m^3 respectively. The initial void ratio of the clay is 0.65. Calculate the consolidation settlement of the pile group under the allowable load. The allowable load Q = 120 kN.

8. Write Short Note on

(a) Rotary Wash Boring

(b) Bore log chart

(c) Floating Foundation

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Subject Code: C3801/R09

M. Tech –I Semester Supply Examinations, February, 2016

DIGITAL SYSTEM DESIGN

(Common to DECS, DSCE, VLSI&ES, ES&VLSI, VLSID&VLSD and VLSI)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) Draw an ASM chart to design control logic of a binary multiplier. Realize the same using MUX, decoder and D-flip flops.
   b) What are the basic elements of an ASM chart? How does the ASM chart differ from a software flow chart?

2. a) With an example, explain how an FPGA is useful in the design of a digital circuit.
   b) Design and implement a BCD counter on PLA. Draw the complete fuse-map circuit.

3. a) Explain the Boolean difference method with an example.
   b) A two level AND-OR circuit has four AND gates feeding one OR gate. The four AND gates realize the product terms $x_1x_3'x_4$, x_2x_4, $x_1'x_3'x_4'$ and $x_1x_2x_3$ respectively. Derive the a-test and b-test for detecting multiple stuck at faults.

4. a) What is PODEM? Explain how PODEM algorithm is used to test faults.
   b) Explain transition count testing with an example.

5. a) The input sequence X shown below has been applied to a reduced five state machine whose state table is to be determined. In response the machine produced the output sequence Z. Show the state table of the machine in standard form if it is known that its starting state is A.

   X: 0 0 0 0 1 0 1 0 1 0 1 0 0 1 0 1 0 0 0 1 0 0 1 0
   Z: 0 1 2 0 1 3 2 1 1 0 1 3 3 2 0 1 3 3 3 2 1 2 1 1

   b) Explain the procedure of designing a fault detection experiment with the help of an example.

6. PLA has the following SSR specifications. Find the maximum SCF for
   a) Only the input part b) Only the output part c) The entire PLA

   INPUT A= {1, 2, 6} B= {1, 5} C= {2, 3, 5, 6}
   D= {3, 4, 7, 9} E= {2, 3, 4, 8, 9} F= {7, 8, 9}
   OUTPUT Z_1= {2, 3, 6, 7, 8, 9} Z_2= {1, 4, 5}

7. a) List out and explain briefly about the faults that may occur in PLAs.
   b) With an example, explain how faults are detected in a PLA.

8. Write a short note on
   a) Minimal closed covers
   b) Races and Hazards.

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Subject Code: C5805/R09

M. Tech –I Semester Supply Examinations, February, 2016

OPERATING SYSTEMS

(Common to NN, CSE, CS and CST)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions

All questions carry EQUAL marks

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1. a) What is an operating system? Explain the operating system services
   b) What is a system call? Explain different types of system calls

2. What is a process? Explain different process scheduling algorithms with example

3. a) Explain short, medium and long term schedulers with the help of state diagram
   b) What is thread? Describe User level and kernel level threads

4. Explain the following with example
   a) Processes synchronization
   b) Critical section problem
   c) Semaphores

5. a) What is dead lock? Explain necessary conditions to exist deadlock
   b) Apply the deadlock detection algorithm to the following data and show the results
   Available=(2 1 0 0)

   Request = $\begin{pmatrix} 2 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{pmatrix}$, Allocation = $\begin{pmatrix} 0 & 0 & 1 & 0 \\ 2 & 0 & 0 & 1 \\ 0 & 1 & 2 & 0 \end{pmatrix}$

6. a) What is virtual memory? Explain address translation in a paging system
   b) What is page replacement? Explain Optimal page replacement algorithm with suitable example

7. a) Explain different memory management techniques
   b) Explain the First fit, Best- fit, and Worst-fit in detail

8. a) What is a File? Explain the file system architecture with diagram
   b) Explain the importance of Cryptography for protection and security of data

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