

Code No: 13MTE1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech I Semester Regular/Supplementary Examinations, February, 2016****ADVANCED HEAT AND MASS TRANSFER****(THERMAL ENGINEERING)****Time: 3 hours****Max. Marks: 60****Answer any FIVE questions****All questions carry equal marks**

1. a) At a given instant of time, the temperature distribution within an infinite homogenous body is given by $T(x,y,z)=x^2-2y^2+z^2-xy+2yz$. [6M]
Assuming constant properties and no internal heat generation, determine the regions where temperature changes w.r.t time in x-direction under the assumption that there are no temperature gradients in y,z directions. Take $k=40 \text{ W/m-K}$; $\rho=1600 \text{ kg/m}^3$; $C_p = 4 \text{ kJ/kg K}$.
b) Explain about lumped system analysis and the non-dimensional numbers associated with it. [6M]
2. a) Depict the variation of velocity boundary layer thickness (δ) and local heat transfer coefficient (h) for flow over an isothermal flat plate and explain the phenomena behind such variation. [7M]
b) Explain the role of prandtl number in the forced and natural convection heat transfer with its physical significance. [5M]
3. Air at a pressure of 6 kN/m^2 and temperature of 300°C flows with a velocity of 10 m/s over a flat plate 0.5 m long. Estimate the cooling rate per unit width of the plate needed to maintain it at a surface temperature of 27°C . [12M]
4. Derive the governing equations for free convection and mention the physical meaning of the terms involved. Also depict the velocity and thermal boundary layers development on a heated vertical plate. [12M]
5. a) Explain with a neat sketch the boiling curve for saturated water at atmospheric pressure. [6M]
b) The bottom of a 0.3 m diameter copper pan is maintained at 118°C by an electric heater. Estimate the power required to boil water in this pan and the evaporation rate. [6M]
6. Write short notes on the following. [12M]
 - i) Wein's displacement law.
 - ii) Absorptivity and reflectivity
 - iii) View factors and their importance.
7. Derive heat conduction equation in 3D Cartesian system. [12M]
8. Discuss about the following. [12M]
 - i) Developed flow versus Fully developed flow.
 - ii) No slip boundary condition.
 - iii) Critical Reynolds number in internal and external flow.

Code: 13MPE1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech, I Semester Regular/Supplementary Examinations, February,2016****POWER ELECTRONICS CONTROL OF DC DRIVES****(Power Electronics and Electric Drives)****Time: 3 hours****Max.Marks:60****Answer any FIVE questions
All questions carry equal marks**

- 1 (a) Explain about theory of operation with relevant schematic representation and induced EMF of DC machine? [6M]

(b) Explain about equivalent circuit and electromagnetic torque in modeling of DC machine? [6M]
- 2 (a) What are Speed Control Methods of DC motor ? Explain each of them for Separately Excited DC motor ? [6M]

(b) Explain operation of Single phase Full Converter Fed Separately Excited DC motor with the Help of Torque-Speed Characteristics for Different Firing angles? [6M]
- 3 (a) Describe the operation three phase full converter fed separately excited DC motor drive? Deduce the critical value of load inductance? [6M]

(b) A separately excited dc motor having a speed of 10HP, 330V,600rpm is controlled by a three Phase Full converter, has armature and field resistances of 0.4Ω and 150Ω with Y-connected Supply voltage $V_s=220$ V. $f = 50$ Hz. The motor voltage constant is $K_t=1.4$ V/A – rad/s. The armature field's current is continuous and ripple-free. Determine the firing angle, if the field converter is operated at its field current and the torque developed, $T=120$ N-m having a speed of 600 rpm. [6M]
- 4 Discuss the rectifier operation of 3-phase control bridge converter with highly inductive load with the help of suitable waveforms. Also derive the expressions for output voltage and input power factor. [12M]
- 5 (a) Explain about the design of current Controller with the inner current loop of Block diagram of DC motor drive ? [6M]

(b) Draw the Flow Chart for Simulation of a Single Quadrant Phase Controlled DC motor Drive. [6M]

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- 6 Deduce Steady State Analysis by Average Method and Instantaneous Steady State Computation for Continuous Current Conduction of Chopper Controlled DC Motor Drive. [12M]
7. (a) Discuss the Input Circuit Configurations of the Chopper and their Ratings. [6M]
- (b) Explain the About of Principle of Operation of DC-DC Converter With waveforms? [6M]
- 8 (a) Compare PWM and Hysteresis Current Controllers with Realization Closed Loop Chopper Controlled Drive System. [6M]
- (b) Explain the design of Current Controller in Closed Loop Chopper Controlled DC Motor Drive? [6M]

Code No: 13MVL1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI****(AUTONOMOUS)****I M. Tech. I Semester Regular/Supplementary Examinations, February, 2016****ANALOG AND DIGITAL IC DESIGN****(Common to VLSI System Design and Digital Electronics & Communication Systems)****Time: 3 hours****Max. Marks: 60****Answer any FIVE questions****All questions carry equal marks**

1. a) Compare the performance of various op-amp topologies.
b) Illustrate with neat sketches about thermal and flicker noise.
2. a) Explain the operation of a PLL with necessary equations.
b) List out the applications of PLL.
3. a) Explain the importance of switch sharing in switched capacitor filters.
b) Find the capacitance values needed for a first order switched capacitor circuit such that its 3-dB point is at 10 KHz when a clock frequency of 100 KHz is used. It is also desired that the filter have zero gain at 50 KHz and the dc gain be unity. Assume $C_A = 10 \text{ pF}$.
4. a) Compare the performance of various logic families with respect to noise margin, fan-out, propagation delay, power dissipation and speed of operation.
b) Mention a data flow VHDL program for a 4 input, 8 bit multiplexer.
5. a) Draw the internal structure of 64K x 1 DRAM and explain its operation.
b) Sketch and explain the internal architecture of Xilinx 9500-family CPLD.
6. a) Illustrate how charge injection errors are minimized in comparators.
b) Show that an estimate of the time constant for a network of n resistors, each of size R in series, with capacitive loading C at each node, is given by $\tau = RC (n^2/2)$. How much settling time is required for the output to settle to 0.1 percent of its final value?
7. a) Explain the operation of 3 bit thermometer based D/A converter.
b) Explain the operation of flash type A/D converter with neat sketches.
8. a) Explain the working of successive approximation type D/A converter.
b) Write a VHDL code for 4 bit binary counter.

Code No: 13MCS1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. I Semester Regular/Supplementary Examinations, February, 2016****Database Management Systems
(Computer Science and Engineering)****Time: 3 hours****Max Marks: 60****Answer any FIVE questions
All questions carry equal marks**

1. a) What is data model? List and Explain different types of data models.
b) What is E-R Model? Draw an E-R Diagram for any Banking system [6+6]
2. a) Explain What are the problems caused by redundancy and decomposition of relation
b) What is normalization? What are the conditions are required for a relation to be in 2NF, 3NF and BCNF [4+8]
3. a) Explain about Aggregate functions in SQL with examples.
b) What are integrity constraints? Define the terms primary key constraints and foreign key constraints. How are these expressed in SQL? [6+6]
4. a) Differentiate between the operations performed in relational algebra and tuple relational calculus?
b) What is transaction? Explain the ACID Properties of transaction with examples [6+6]
5. a) What is indexing ? Explain the cluster index, primary and secondary indexes with examples
b) Explain about B+-tree indexing techniques. [6+6]
6. a) What is locking Protocol? Describe the Strict Two Phase locking Protocol? What can you say about the schedules allowed by this protocol.
b) What is log based recovery ? Explain the Check point log based recovery scheme for recovering the data base. [6+6]
7. a) Explain the multiversion concurrency schemes. What are its benefits and disadvantages in comparison to locking protocols.
b) Describe the various deadlock handling schemes in transaction processing. [8+4]
8. Describe the following briefly.
a) Different types of transaction failures
b) Advanced recovery Techniques.
c) Advantages and disadvantages of Shadow paging [4+4+4]

MATRIX ANALYSIS OF STRUCTURES

(STRUCTURAL ENGINEERING)

Time : 3 hours

Max Marks : 60

Answer any FIVE questions
All questions carry equal marks

1. a) Briefly explain the concept involved in flexibility matrix method and stiffness matrix method. (8m)
b) Generate the flexibility matrix for the simply supported beam AB with the coordinates shown in fig. (1) (4m)

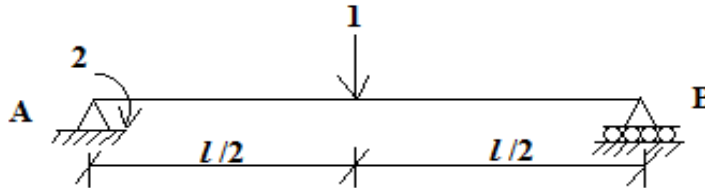


Fig. (1)

2. Derive the stiffness matrix for truss element in global coordinate system the local axis of which is inclined at an angle ' θ ' with the global x-axis. (12m)
3. Analyse the pin-jointed frame shown in Fig(2). by stiffness matrix method cross-section area of all members = 1000mm^2 ; $E = 200 \text{ KN/mm}^2$. (12m)

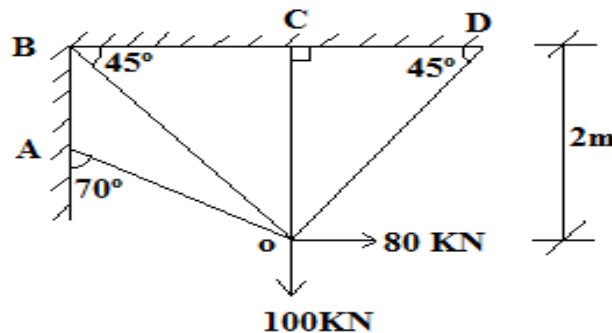


Fig. (2)

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4. Explain the process of formation of joint stiffness matrix for the two span beam shown Fig. (3) Neglecting axial deformations. (12m)

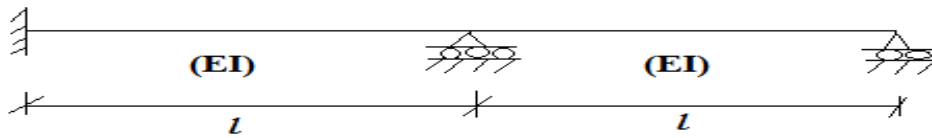


Fig. (3)

5. Using direct approach analyse the beam shown in Fig. (4) by stiffness matrix Method. (12m)

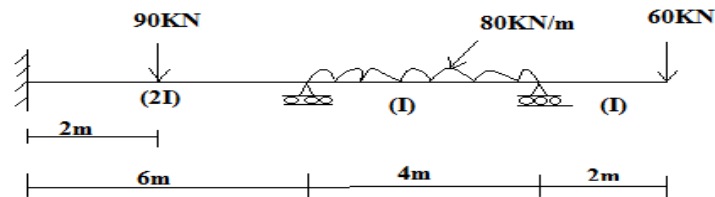


Fig. (4)

6. (a). Explain the steps involved to get the required solution by direct flexibility Method. (4m)
(b). Analyse the continuous beam shown in Fig (5). by flexibility matrix method. (8m)

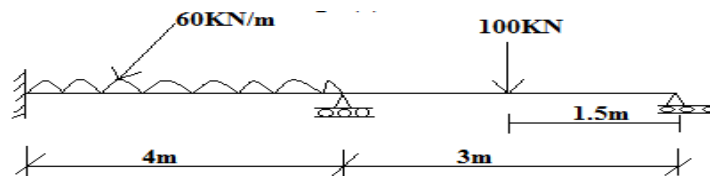


Fig. (5)

7. Analyse the grid shown in Fig. (6) by stiffness method. Assume length, cross sectional area and modulus of elasticity of each member as 3.0m , $0.4 \times 0.4\text{m}^2$ and $2 \times 10^{11} \text{ N/m}^2$ respectively. Assume $EI=2GJ$. (12m)

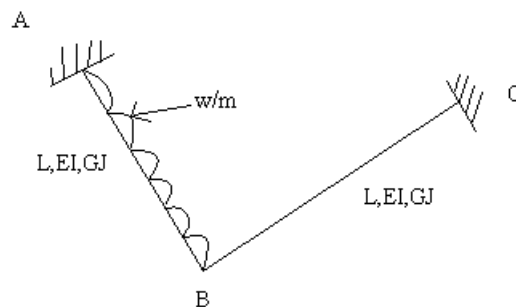


Fig. (6)

8. (a) Explain the necessity of shear wall in multi-storied frames. (6m)
(b) Explain with neat sketch shear wall-frame interaction. (6m)