

**13MTE1003****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech. I Semester Regular/Supplementary Examinations, March, 2015****ADVANCED HEAT AND MASS TRANSFER****(Thermal Engineering)****Time: 3 hours****Max.Marks:60****Answer any FIVE questions  
All questions carry equal marks**

1. a) Differentiate steady state and transient heat transfer. [6M]  
b) Explain the boundary and initial conditions. [6M]
2. a) Explain the continuity equation with suitable operating line equation. [6M]  
b) Differentiate between implicit and explicit schemes of finite differenced methods. [6M]
3. a) Predict the momentum equation for the laminar boundary layer on a flat plate. State the assumptions made. [8M]  
b) Describe the velocity and temperature profiles. [4M]
4. derive an expression for heat transfer coefficient for laminar film condensation on vertical surface. [12M]
5. a) Explain with diagrams of boiling curve. [5M]  
b) Ammonia at  $40^{\circ}\text{C}$  is condensing inside a horizontal tube of 16mm ID. Mass velocity of ammonia vapour at inlet is  $20 \text{ kg/m}^2 \text{ s}$ . Surface of the tube is maintained at a constant temperature of  $20^{\circ}\text{C}$  by circulating cold water. Calculate the fraction of vapour that will condense if the tube is 0.5m long. Use the following data  
properties of liquids at  $T_f=30^{\circ}\text{C}$ :  $\rho_L=596.4 \text{ kg/m}^3$ ,  $C_{pl}=4890 \text{ J/kg }^{\circ}\text{C}$ ,  $\mu_L=2.081 \times 10^{-5} \text{ kg/msec}$ ,  $K_L=0.507 \text{ W/m }^{\circ}\text{C}$  and  $g=9.81 \text{ m/s}^2$ .  
Properties of saturated vapour at  $40^{\circ}\text{C}$ :  $h_{fg}=1098.8 \times 10^3 \text{ J/kg}$ ,  $\rho_v=12.029 \text{ kg/m}^3$  and  $\mu_v=1.0735 \times 10^{-5} \text{ kg/m s}$ . [7M]
6. A mixture of He and  $\text{N}_2$  gas is contained in a pipe at 2980K and 1 atm total pressure which is constant throughout. At one end of the pipe at point 1 the partial pressure of He is 0.60atm and at the other end 0.2m, pressure is 0.20atm. calculate the mass diffusive flux of He at steady state if diffusivity of He- $\text{N}_2$  mixture is  $0.687 \times 10^{-4} \text{ m}^2/\text{sec}$ . [12M]
7. A chamber of heat-curing large aluminium sheets, lacquered black on both sides, operates by passing the sheets vertically between two steel plates 150mm apart. one of the plates is at  $300^{\circ}\text{C}$ , and the other, exposed to the atmosphere, is at  $25^{\circ}\text{C}$ . (a) what is the temperature of the lacquered sheet? (b) What is the heat transferred between the walls when equilibrium has been reached? Neglect convection effects. Emissivity of steel is 0.56; emissivity of lacquered sheets is 1.0. [12M]
8. Explain and design the nusselt's theory of film condensation on a vertical plate. State the assumptions made. [12M]

**Code No: 13MIT1003****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech I Semester Regular/Supplementary Examinations, March – 2015****DATABASE MANAGEMENT SYSTEMS  
(Information Technology)****Time: 3 hours****Max. Marks: 60****Answer any FIVE questions  
All questions carry equal marks**

1.   a) Define data model. Discuss in detail about various data models. [6M]  
      b) Explain about the following [6M]  
          i. Scheme      ii. Instance      iii. Data independence
2.   a) Write an algorithm/process to convert an ER diagram into tables. [6M]  
      b) Describe the concept of specialization and generalization with suitable examples. [6M]
3.       What is normalization? Why is it needed? Discuss in detail about various normal forms. [12 M]
4.   a) Explain the guidelines of database design. [6M]  
      b) What is an inference rule? List and explain each of them. [6M]
5.   a) Compare and contrast DDL, DML, & DCL [4M]  
      b) What are the aggregate functions used in SQL? Explain them. [4M]  
      c) Describe various join operators used in SQL with example. [4M]
6.   a) Discuss any four relational algebra operations with examples. [6M]  
      b) Explain how a deadlock can be handled. [6M]
7.       Explain in detail about the concept of multi-level indexing using B-tree. [12M]
8.   a) Explain the concept of deferred update recovery mechanism. [6M]  
      b) Write and explain time-stamp ordering algorithm for concurrency control. [6M]

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**Code: 13MPE1003****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech, I Semester Regular/Supplementary Examinations, March,2015  
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) Draw the equivalent circuit of dc motor Armature and Deduce the electromagnetic torque equation [6M]  
(b) Derive a transfer function of DC motor from block diagram? [6M]
2. Draw and explain the power circuit of single phase fully controlled converter feeding a separately excited motor. Explain the operation in both continuous and discontinuous armature current modes with suitable wave forms. [12M]
3. (a) Explain the principles of DC motor speed control [4M]  
(b) A 220V, 1500rpm, 50A separately excited motor with armature resistance of  $0.5 \Omega$ , is fed from a 3-phase fully-controlled rectifier. Available ac source has a line voltage of 440V, 50Hz. Determine the value of firing angle when  
(i) motor is running at 1200 rpm and rated torque  
(ii) when motor is running at -800 rpm and twice the rated torque. Assume continuous conduction. [8M]
4. (a) Draw the speed –Torque characteristics of 3-Phase fully controlled converter fed DC separately excited motor. [6M]  
(b) Derive the transfer functions of the subsystems of DC motor drives. [6M]
5. (a) Design a current controller of phase controlled Dc motor drives. [6M]  
(b) Derive the necessary equations and draw the blocks for simulation of the one-quadrant DC motor drive [6M]
6. (a) What is the input of the chopper, How it is converted to regeneration capability. [6M]  
(b) Write short notes on Rating of the devices of chopper in motoring mode. [6M]
7. Explain the four quadrants of chopper with circuit diagrams and wave forms. [12M]
8. (a) Explain the speed controlled drive system with inner current control loop using Pulse-Hysteresis controller. [6M]  
(b) Design a current controller for chopper controlled dc motor drives. [6M]

**Code No: 13MVL1003****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M. Tech. I Semester Regular/Supplementary Examinations, March, 2015****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) Explain the operation of Common Gate Amplifier with neat sketches. [6M]  
b) Derive the expression for noise bandwidth of a low pass filter. [6M]
2. a) Explain the operation of a PLL with necessary equations. [6M]  
b) Illustrate the necessity of PLL in analog and digital systems. [6M]
3. a) Illustrate the functioning of Parasitic – Sensitive Integrator with neat sketches. [7M]  
b) Assuming the maximum voltage change due to clock feed through is 1 mV, what are the maximum clocking frequencies considering only channel charge injection for technologies having minimum channel lengths of 0.8  $\mu\text{m}$ , 0.5  $\mu\text{m}$ , and 0.3  $\mu\text{m}$ . [5M]
4. a) Demonstrate the performance of various logic families with respect to noise margin, fan-out, propagation delay, power dissipation and speed of operation. [6M]  
b) Mention a VHDL structural program for a D latch. [6M]
5. a) Draw the internal structure of 8 x 4 diode ROM and explain its operation. [6M]  
b) Draw and explain the architecture of XC 4000 FPGA I/O block. [6M]
6. a) Illustrate the operation of a high speed comparator with track and latch stage. [6M]  
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? [6M]
7. a) Discuss the operation of multiple R string D/A converter. [6M]  
b) Explain the operation of integrating A/D converter with neat sketches. [6M]
8. a) Explain the working of SRAM with the help of internal structure. [6M]  
b) Write a VHDL code for 3 to 8 decoder. [6M]

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**AR13**

**SET-02**

**Code No: 13MCS1003**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I M.Tech. I Semester Regular/Supplementary Examination, March,2015**

**Data Base Management Systems  
(Computer Science and Engineering)**

**Time: 3 hours**

**Max.Marks:60**

**Answer any FIVE Questions  
All Questions carry equal marks**

1. a) Define i) Data Abstraction ii) Instances and Schemas [3M]  
b) What are the advantages and disadvantages of DBMS? [9M]
2. What is ER Diagram? Develop detailed ER Diagram for Company Database. [12M]
3. a) What is Functional Dependency? Explain merits and demerits of Normalization. [8M]  
b) Compare BCNF and 3NF. [4M]
4. a) Explain different Aggregate Functions. [7M]  
b) Explain inner and outer joins with examples. [5M]
5. a) Explain about Timestamp ordering. [6M]  
b) Explain about Relational Calculus. [6M]
6. Write Short notes on  
i) Failure Classification [4M]  
ii) Shadow Paging [8M]
7. What is B+ Tree? Explain the structure of B+ Tree?How can you perform insertion and deletion operations on B+ Trees? Explain with an example. [12M]
8. Write short notes on  
i) Serializability [7M]  
ii) Recoverability [5M]

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