

Code No: 13MTE1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M. Tech., I Semester Regular Examinations, January - 2014****ADVANCED HEAT AND MASS TRANSFER****(Thermal Engineering)****Time: 3 hours****Max Marks: 60****Answer any FIVE questions
All questions carry equal marks**

1. A steel tube with 5 cm inner diameter, 7.6 cm outer diameter, and thermal conductivity $15 \text{ W/m}^\circ\text{C}$ is covered with an insulative covering of thickness 2 cm and thermal conductivity $0.2 \text{ W/m}^\circ\text{C}$. A hot gas at a temperature of 330°C with a heat transfer coefficient of $400 \text{ W/m}^2^\circ\text{C}$ flows inside the tube. The outer surface of the insulation is exposed to cooler air at 30°C with heat transfer coefficient of $60 \text{ W/m}^2^\circ\text{C}$.
 - a) Calculate the heat loss from the tube to the air for 10 m height of the tube
 - b) Calculate the temperature drops resulting from thermal resistance of the hot gas flow, the steel tube, the insulation layer and the outer air.
2. Consider the steady state heat conduction in a slab of thickness (L) 1 cm, in which heat (q) is generated at a constant rate of $7.2 \times 10^7 \text{ W/m}^2$. Thermal conductivity (K) of the slab is 18 W/m K . The front face of the slab is maintained at a temperature of 50°C and at the rear face heat is dissipated by convection with a heat transfer coefficient of $200 \text{ W/m}^2 \text{ K}$ into an ambient at temperature (T) of 100°C . Dividing the region into five equal subregions, write the finite difference formulation of this heat conduction problem and compute the temperatures at the nodes.
3. Air at 27°C and 1 atm flows over a flat plate at a speed of 2 m/s. Calculate the boundary layer thickness at distances of 20 and 40 cm from the leading edge of the plate. Calculate the mass flow rate which enters the boundary layer between $x=20 \text{ cm}$ and $x=40 \text{ cm}$. The viscosity of air at 27°C is $1.85 \times 10^{-5} \text{ kg/m}$. Assume unit depth in z direction.
4. What is the energy equation for laminar boundary layer on a flat plate? What assumptions are involved in deriving this equation?
5.
 - a) A square plate 0.4×0.4 maintained at a uniform temperature of 400 K is suspended vertically in quiescent atmosphere air at 300 K. Determine the boundary layer thickness at the trailing edge of the plate (at $x=0.4 \text{ m}$).
 - b) Distinguish free convection and forced convection
6. Derive an expression for heat transfer coefficient for laminar film condensation on vertical surface.
7. The configuration of a furnace can be approximated as an equilateral triangular duct which is sufficiently long that the end effects are negligible. The hot wall is maintained at 900 K and has an emissivity 0.8. The cold wall is at 400 K and has an emissivity of 0.8. The third wall is reradiating for which heat transfer rate (Q) = 0. Calculate the net radiation heat flux leaving the hot wall.
8. Gaseous hydrogen is stored at elevated pressure in a rectangular steel container of 10 mm wall thickness. The molar concentration of hydrogen in steel at the outer surface is 2 kg/mol/m^3 , while the concentration of hydrogen in steel at the inner surface is 0.5 kg/mol/m^3 . The binary diffusion coefficient for hydrogen in steel is $0.26 \times 10^{-12} \text{ m}^2/\text{s}$. What is the mass flux of hydrogen through the steel?

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SET-01

CODE: 13MIT003

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

I M.Tech I Semester Regular Examinations, January – 2014

**DATA BASE MANAGEMENT SYSTEMS
(Information Technology)**

Time: 3 Hours

Max. Marks: 60

Answer any Five Questions

All Questions carry equal marks

1. a. What is DBMS? What are the applications of Database System? 5M
b. What are the advantages and disadvantages of DBMS? 7M
2. Explain in detail the major components in ER Diagram and construct an E-R diagram for the following Database
A university consists of a number of departments. Each department offers several courses. A number of modules make up each course. Students enrol in a particular course and take modules towards the completion of that course. Each module is taught by a lecturer from the appropriate department, and each lecturer tutors a group of students. 12M
3. a. What is Functional Dependency? Explain merits and demerits of Normalization. 8M
b. Compare BCNF and 3NF. 4M
4. Explain various components of SQL. 12M
5. Explain the following relational algebra operations? 12M
a) Select b) Project c) Cartesian-Product d) Division
6. a. What are different types of Failures? Explain. 5M
b. Explain shadow paging with a neat diagram and discuss its drawbacks. 7M
7. a. Explain different types of ordered indices. 7M
b. Write short notes on B-Trees. 5M
8. Explain about
a) Serializability 7M
b) Recoverability 5M

Code: 13MPE1003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech, I Semester Regular Examinations, January – 2014****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) Obtain a transfer function of DC motor from block diagram? 8M
(b) Explain the State space modelling of dc machine 4M
2. (a) Explain the speed control of dc motor with Armature and field control method. 6M
(b) Illustrate the four quadrant operation with dual converter 6M
3. Draw and explain the power circuit of single phase semi converter feeding a separately excited motor. Explain the operation in both continuous and discontinuous armature current modes with suitable wave forms 12M
4. (a) Explain Two quadrant three phase converter-controlled DC motor drive 6M
(b) A 220V, 960 rpm, 12.8A, separately excited dc motor has armature circuit resistance and inductance of 2 ohm and 150mH, respectively. It is fed from a single phase half controlled rectifier with an ac source voltage of 230V, 50Hz. Calculate
(i) Motor torque for $\alpha = 60$ degrees and speed = 600 rpm.
(ii) Motor speed for $\alpha = 60$ degrees and Torque $T = 20$ N-m. 6M
5. (a) Design the speed controller for a closed loop block diagram of a separately excited DC motor drive 6M
(b) Draw the flowchart for simulation of one-quadrant DC motor drive. 6M
6. Explain about Steady –state analysis of chopper controlled DC motor drive 12M
7. (a) Discuss the working of a single –quadrant DC chopper fed separately excited DC motor with the help of neat circuit diagram and wave forms 6M
(b) Write short notes on Rating of the devices of chopper in motoring mode 6M
8. (a) Explain the speed controlled drive system with inner current control loop using Pulse –Width-Modulation (PWM) controller 8M
(b) Write short notes on modelling of current controllers for chopper drive 4M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMUS)

I M.Tech I Semester regular examinations, January - 2014

ANALOG AND DIGITAL IC DESIGN

(Common to VLSI System Design and Digital Electronics & Communication Systems)

Time: 3Hours

SET - 1

Max. Marks: 60

Answer any *FIVE* questions. All questions carry equal marks.

- 1) Briefly explain about noise models of
 - a) Junction Diode b) BJT c) MOS transistor
- 2)
 - a) Draw the block diagram of PLL & explain.
 - b) Derive lock in range & capture range.
- 3)
 - a) What is a switched capacitor circuit ? List the important features of it.
 - b) Explain the operation of switched capacitor gain circuit.
- 4)
 - a) Write VHDL program of 2^n to n priority encoder.
 - b) Write data flow style VHDL program for an 8-Bit multiplexer.
- 5)
 - a) Compare CMOS, TTL & ECL logic families
 - b) What are the necessary conditions to interface CMOS gates to TTL gates?
- 6)
 - a) What is meant by 2Dimentional decoding & explain with an example.
 - b) Explain ROM access mechanism with neat timing diagram.
- 7) Define charge injection error? How can you overcome this problem explain briefly.
- 8) Write short notes on
 - a) Slew rate in op-amps.
 - b) Thermometer code converters.
 - c) Applications of ROM.

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SET-01

Code No: 13MCS1003

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

I M.Tech. I Semester Regular Examination, January -2014

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. What is DBMS? What are the applications of Database System? 5M
b. Compare Database System with File System. 7M
2. Describe the major components in ER Diagram with a suitable example. 12M
3. What is Normalization? Explain different types of Normalizations? 12M
4. Explain various components of SQL. 12M
5. Explain various fundamental operations in Relational Algebra with Examples. 12M
6. a. Write Short notes on Failure Classification – 5M
b. Explain shadow paging with a neat diagram and discuss its drawbacks. 7M
7. a. Explain different types of ordered indices. 7M
b. Write short notes on B-Trees. 5M
8. a. Explain ACID Properties. 4M
b. Explain different types of Recovery Techniques. 8M
