

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

**I M.Tech., I Semester Regular Examinations, January – 2014
OPTIMIZATION TECHNIQUES AND APPLICATIONS
(Thermal Engineering)**

Time : 3 hours

Max Marks: 60

**Answer Any FIVE Questions
All Questions Carry Equal Marks**

1. Explain in detail the application & merits of LPP techniques in Thermal Engineering.
2. Using geometric programming, solve the following problem
Minimize $f(x) = 40x_1^{-1}x_2^{-1/2}x_3^{-1} + 20x_1x_3 + 20x_1x_2x_3$
Where $x_1^{-2}x_2^{-2} + 4x_1^{-1/2}x_3^{-1}$ and $x_1, x_2, x_3 > 0$
3. Solve the following Dynamic Programming
A contractor has four construction projects under way and wants to minimize the time required to complete all projects. The following table gives the estimated time required to complete the project for a specified number of foreman assigned to the project.

| Project | No. of foreman | | Assigned |
|---------|----------------|----|----------|
| | 1 | 2 | |
| A | 15 | 13 | 12 |
| B | 17 | 15 | 13 |
| C | 19 | 18 | 17 |
| D | 21 | 18 | 18 |

4. Consider the LPP
Maximize $z = 5X_1 + 12X_2 + 4X_3$

Subject to $X_1 + 2X_2 + X_3 = 5$,
 $2X_1 - X_2 + 3X_3 = 9$ Where $X_1, X_2, X_3 \geq 0$

- (i) Discuss the effect of changing the requirement vector from R.H.S. values [5 2] to [7 2] on the optimum solution.
- (ii) If the resource should be increased and by how much to achieve the best marginal increase in the value of the objective function.

5. a) Explain the mixed Integer programming.

b) Solve the following LPP

$$\text{Maximize } z = 3X_1 + 2Y_1$$

$$\text{Subject to } X_1 + Y_1 \leq 6,$$

$$5X_1 + 2Y_1 \leq 20 \quad \text{Where } X_1, Y_1 \geq 0$$

6. Using Golden section search method,

$$\text{Minimize } f(x) = x^2 + 54/x$$

7. Using Poweell's conjugate direction method,

$$\text{Minimize } f(x_1, x_2) = (x_1^2 + x_2 - 11)^2 + (x_1 + x_2^2 - 7)^2$$

8. Using any one Gradient-based method,

$$\text{Minimize } f(x_1, x_2) = (x_1^2 + 2x_2 - 43)^2 + (x_1 + 3x_2^2 - 9)^2$$

CODE : 13MIT1001**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech I Semester Regular Examinations, January - 2014****ADVANCED DATA STRUCTURES
(INFORMATION TECHNOLOGY)****Time: 3 Hours****Max. Marks: 60****Answer any Five Questions
All Questions carry equal marks**

01. a) Write is an Algorithm ? Write an algorithm for function GCD (a,b) and calculate time complexity & space complexity? (6M)
b) Discuss about polynomial and Exponential algorithms? (6M)
02. a) Explain the Applications of Stack with example? (7M)
b) How do we implement Linked Queue? Explain. (5M)
03. a) What is Graph? Explain Graph Traversing Techniques with an example (7M)
b) What is sorting? Write an algorithm for shell sort with their time complexity (5M)
04. a) Explain recursive routines of binary tree traversals with an example. (8M)
b) Explain the process of Expression Tree Construction. (4M)
05. a) Explain the need for height balancing in an AVL tree creation.
b) Explain how we carry out single and double rotations while AVL tree is formed.
c) Assume that the following strings have to be maintained in an AVL tree. Calculate LL, RR, LR, and RL rotations.
Lucknow, Delhi, Bombay, Chennai, Hyderabad, Kolkata, Indore, Bangalore, Pune.
06. Discuss about the following
a) m-way trees
b) Max and min heap
c) Polynomial addition and multiplication
07. a) What is hashing? Explain hash table representation using hash function. (5M)
b) What is collision? Explain Collision resolution techniques with an example (7M)
08. a) Differentiate between internal sorting and external sorting. (4M)
b) Explain Quick sort routine with an example (8M)

Code:13MPE1001

AR13

Set 01

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

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

ELECTRICAL MACHINE MODELING AND ANALYSIS

(Power Electronics and Electric Drives)

Time: 3 Hours

Max Marks: 60

**Answer any FIVE questions
All questions carry EQUAL marks**

- 1) a) Describe basic two-pole machine representation of Commutator machines. [6M]
b) Obtain the voltage and Torque Equation of Primitive Machine. [6M]
- 2) a) Discuss the effect of sudden application of inertia load on the speed and current response of the separately excited DC Motor. [8M]
b) Deduce the mathematical model of DC shunt motor. [4M]
- 3) a) Discuss Parks & Inverse Parks transformation. [6M]
b) Explain briefly Real time model of a Two- phase Induction machine. [6M]
- 4) a) Obtain relation between Stator reference frame model and Rotor reference frame model. [6M]
b) Obtain Dynamic modeling of Three-Phase Induction Motor. [6M]
- 5) a) Derive small Signal equations of Induction machine. [6M]
b) Derive DQ flux linkage model for Three-Phase Induction machine. [6M]
- 6) Derive the expressions for voltage and torque of unsymmetrical 2 phase Induction machine in stationary reference frame. [12M]
- 7) a) Discuss the mathematical model of PM Synchronous motor. [6M]
b) Derive voltage expression in the rotor's dq0 reference frame. [6M]
- 8) Discuss the dynamic performance of synchronous machine when the three phase short circuit fault occurs. [12M]

Code No: 13MVL1001

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

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

DIGITAL SYSTEM DESIGN

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

Time: 3 hours

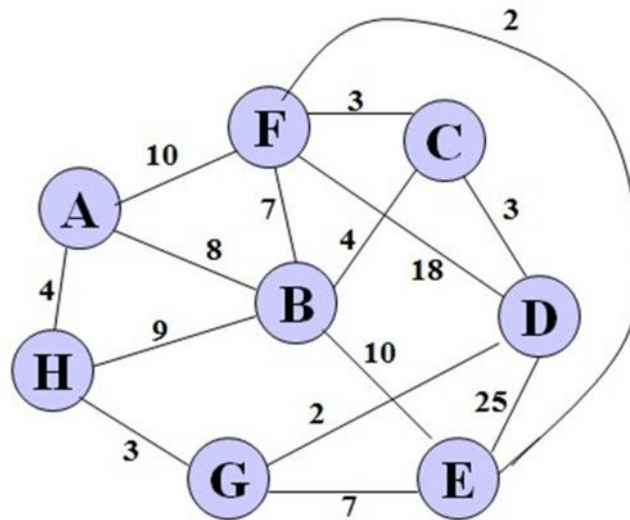
Max. Marks: 60

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

1. (a) Differentiate VHDL with Verilog HDL with respect to various features.
(b) Explain the basic building blocks of an ASM chart.
2. (a) Describe the important features of CPLDs .
(b) Describe the design sequential circuits using ROMs and PLAs.
3. (a) Give the classification of faults that may occur in digital circuits.
(b) Explain how the Kohavi algorithm is useful in the detection of faults in digital circuits.
4. (a) With an example, explain about the transition count testing method.
(b) Explain the procedure involved in D algorithm with an example.
5. With appropriate examples, explain briefly about Homing, Synchronizing and Distinguishing experiments.
6. (a) Discuss briefly, the steps involved in PLA folding algorithm 'COMPACT'.
(b) Explain about PLA minimization by taking an example.
7. (a) List out the faults that may occur in PLAs and explain them.
(b) Implement the following functions using PLA.
 $F_1(A,B,C) = \sum(0,2,5,7)$ and $F_2(A,B,C) = \sum(2,3,5,6,7)$
8. Write short notes on
(a) State reduction.
(b) Cycles and hazards.

Code No: 13MCS1001**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. I Semester Regular Examination, January -2014****Data Structures and Algorithms
(Computer Science and Engineering)****Time: 3 hours****Max.Marks:60****Answer any FIVE Questions****All Questions carry equal marks**

1. Define Linked List. Explain about insertion and Deletion in Linked list. 12M
2. a) Write the Algorithm for Merge sort and Explain with an example. 8M
b) Derive the Time Complexity for Merge Sort. 4M
3. Explain Prim's Algorithm for finding minimum cost spanning tree. 12M



4. a) Write an algorithm for All Pairs Shortest Path. 5M
b) Write the control abstraction of back tracking and write N Queens back tracking algorithm. 7M
5. Define Binary Tree. What are the operations performed on binary trees? Explain different Tree Traversals? 12M

6. Write an algorithm for Knapsack problem by Dynamic Programming and Find out an optimal solution for the following instance.

Knapsack of capacity $W = 5$

$$w_1 = 2, v_1 = 12$$

$$w_2 = 1, v_2 = 10$$

$$w_3 = 3, v_3 = 20$$

$$w_4 = 2, v_4 = 15$$

12M

7. a) Write briefly about Dictionaries. 5M
b) What is Hashing? Explain open addressing techniques. 7M
8. a) Explain Floyd's Algorithm. 5M
b) Explain Job Sequencing with deadlines and solve the Job Sequencing problem given $n = 5$, profits $(P_1, P_2, P_3, P_4, P_5) = (1, 5, 20, 15, 10)$ and corresponding deadlines $(1, 2, 4, 1, 3)$ using Greedy Strategy. 7M