

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT,
TEKKALI
(AUTONOMOUS)
I M.Tech., I Semester Regular/Supplementary Examinations, March, 2015
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 optimization techniques in Thermal Engineering.
2. Using geometric programming, solve the following problem
 Minimize $f(x) = c_1 x_1 x_2 x_3 + c_2 x_1 x_2^{-1} + c_3 x_2 x_3^{-2} + c_4 x_1^{-3} x_2$
 Where $c_j > 0, x_j > 0; j = 1, 2, 3, 4$ and $i = 1, 2, 3$
3. Solve the following Dynamic Programming
 Min $Z = X_1 - 3X_2 + 2X_3$
 Subject to $3X_1 - X_2 + 2X_3 \leq 15,$
 $2X_1 + 4X_2 \leq 12$
 $4X_1 + 3X_2 + 0X_3 \leq 10$ Where $X_1, X_2, X_3 \geq 0$
4. a) Develop General Erlang Queuing Model with suitable parameters.
 b) A super market has two girls at the counters. If the service time for each customer, is exponential with a mean of 4 minutes and if people arrive in a poisson fashion at the rate of 10 per hour. Find probability of having to wait for service, expected percentage of idle time for each girl, if a customer has to wait, what is the expected length of his waiting time.
5. Consider the LPP
 Maximize $z = 4X_1 + 6X_2 + 2X_3$
 Subject to $X_1 + X_2 + X_3 \leq 3,$
 $X_1 + 4X_2 + 7X_3 \leq 9$ Where $X_1, X_2, X_3 \geq 0$
 - a) Solve the LPP
 - b) (i) Find the range of value of non-basic variable coefficient, c_3 such that the current solution will still remains optimal.
 (ii) what happens if c_3 is increased to 12 ? What is the new optimal solution ?
 - c) (i) Find the range of on basic variable coefficient c_1 such that the current optimal solution remains optimal ?
 (ii) Find the effect $c_1 = 8$ on the optimal solution.
 - d) Find the effect of changing the objective function to $z = 2X_1 + 8X_2 + 4X_3$ on the current optimal solution

6. a) Explain the branch & bound algorithm for Integer programming.
b) Solve the following LPP

$$\begin{array}{ll} \text{Maximize } z = X_1 + X_2 \\ \text{Subject to } \begin{array}{ll} 7X_1 - 5X_2 & \leq 7, \\ -12X_1 + 15X_2 & \leq 7 \end{array} & \text{Where } X_1, X_2 \geq 0 \end{array}$$

7. Using Fibonacci search method,
Minimize $f(x) = x^2 + 54/x$

8. Find the minimum of

$$f = \lambda^5 - 5\lambda^3 - 20\lambda + 5$$

by quadratic interpolation method.

AR13

SET-02

CODE: 13MIT1001

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

I M.Tech I Semester Regular/Supplementary Examinations, March,2015

**ADVANCED DATA STRUCTURES
(INFORMATION TECHNOLOGY)**

Time:3 Hours

Max.Marks:60

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

1. a) Explain all asymptotic notations with examples (6M)
b) Write algorithm to search element in the given array and find its time complexity (6M)
2. a) Develop algorithm to convert infix to postfix (6M)
b) Write algorithms for operations Insertion and reverse of the linked list. (6M)
3. a) write algorithm to implement quick sort and derive its time complexity (8M)
b) Write algorithm to implement bubble sort technique. (4M)
4. a) Illustrate the concept of Threaded binary tree with suitable example (6M)
b) Develop recursive algorithms for inorder, preorder, postorder tree traversals. (6M)
5. a) What are the properties of BST(Binary Search Tree). Develop algorithms for BST insertion and Deletion operations. (8M)
b) Construct Min and Max heap with the numbers {45, 23, 7, 9, 8, 56, 1,4} (4M)
6. a) What is spanning tree? Write algorithm to find minimum cost spanning tree. (6M)
b) What is hashing? Explain different collision resolution technique. (6M)
7. a) Discuss different external sorting algorithms with examples (7M)
b) Write algorithm for insertion sort (5M)
8. a) Develop algorithms to implement polynomial addition and multiplication (7M)
b) Explain the concept of garbage collection Specify its advantages and disadvantages. (5M)

Code:13MPE1001**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. I Semester Regular/Supplementary Examinations, March,2015****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) Derive the expression for Power loss and Power stored for a generalized 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. [6M]
b) Derive the mathematical model of DC series and shunt motor. [6M]
- 3) a) Describe the formulation of transformation of Three-Phase variables to a stationary reference frame. [6M]
b) Discuss what is meant by power equivalence? How it is helpful in the reference frame theory. [6M]
- 4) Deduce the mathematical model of three phase symmetrical stator winding of induction motor in stator reference frame and synchronously rotating reference frame. [12M]
- 5) a) Derive small Signal equations of Induction machine. [6M]
b) Derive DQ flux linkage model for Three-Phase Induction machine. [6M]
- 6) a) Explain the analysis of steady state operation of unsymmetrical 2 phase Induction machine. [6M]
b) Derive the voltage and torque equations for unsymmetrical 2 phase Induction machine. [6M]
- 7) Explain what are the different inductances considered for mathematical modeling of Synchronous motor [12M]
- 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
(AUTONOMUS)**

I M.Tech. I Semester Regular/Supplementary Examinations, March,2015

DIGITAL SYSTEM DESIGN

(Common to VLSI System Design and DECS)

Time: 3 hours

Max. Marks: 60

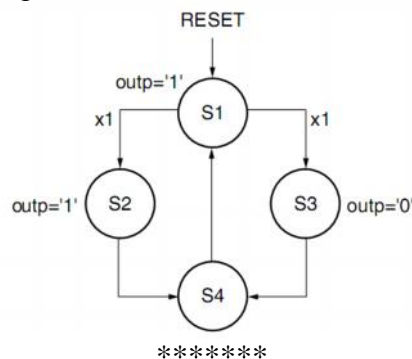
Answer any five questions

All questions carry equal marks

1. a) what is the difference between 'Mealy' and 'Moore' models of sequential machines?
Explain using structural diagrams.
- b) Design Mealy State Machine for '111' Sequence Detector.
2. a) Explain the architecture of the CPLD
- b) Why is FPGA preferred over CPLD? Explain the architecture of the FPGA.
3. a) what are the different faults found in combinational circuits? How can they be categorized?
- b) With an example, explain the LFSR concept
4. a) Explain the signature analysis and testing for stuck at faults.
- b) Perform the analysis and explain the test pattern generation using PODEM algorithm.
5. a) Discuss briefly, simple and multiple PLA foldings.
- b) How can you test the digital circuit using Boolean difference method?
6. a) write a short note on Races and hazards
- b) Explain state reduction? What is reduced state table of bellow given state table?

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	B	C	1	0
B	F	D	0	0
C	D	E	1	1
D	F	E	0	1
E	A	D	0	0
F	B	C	1	0

7. a) Describe the advantages of PLA minimization and folding.
- b) Design a 3 bit binary to grey code converter and realize the circuit using PLA.
8. a) Implement comparator using ROM.
- b) Write HDL code to following FSM.



Code No: 13MCS1001**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. I Semester Regular/Supplementary Examinations, March,2015****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 a Stack. Describe the Stack ADT. [12]
- 2) (a) Determine the running time of Quick sort for
 - (b) Reverse order input
 - ii. Random input
 - iii. Sorted input
- (b) Derive the time complexity of binary search. [9+3]
- 3) (a) What are the problems associated with Quadratic Probing? [6+6]
- (b) How do you solve the problems of Quadratic Probing?
- 4) (a) Explain the procedure for Warshall's algorithm. [6+6]
- (b) Write an algorithm for finding minimum cost of the graph using Prim's algorithm
- 5) (a) Describe the Control abstract for Divide and Conquer technique. [5+7]
- (b) Explain the Job Sequencing within Deadlines problem.
- 6) (a) Explain the OBST algorithm. [6+6]
- (b) Solve the Knapsack Problem by considering the instance $n=3$, $m=6$,
 $(w_1, w_2, w_3) = (2,3,4)$ and $(p_1, p_2, p_3) = (1,2,5)$.
- 7) (a) Explain how the Hamiltonian cycle problem is solved using Backtracking concept
- (b) Suggest a solution for 8-queens problem [6+6]
- 8) (a) compare and contrast between brute force approach and backtracking
- (b) Explain how the travelling sales person problem is solved [4+8]