Code: 16MTE1001
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January 2017
OPTIMIZATION TECHNIQUES AND APPLICATIONS
(Thermal Engineering)

Time: 3 hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. a) Explain about one dimensional optimisation methods.
    b) Write about Gradient methods and about Variable metric method.

2. a) Solve the following using dynamic programming:

    Maximise $Z = 10X_1 + 30X_2$

     subject to $30X_1 + 6X_2 \leq 168$

                     $12X_2 \leq 240$

                     $X_1, X_2 \geq 0$

    b) Explain the terminoligies in dynamic program and what are applications of
    dynamic programming.

3. Find the optimum intiger solution to the following linear programming problem:
    Maximise $Z = 5X_1 + 8X_2$
    subject to $X_1 + 2X_2 \leq 8$

                $4X_1 + 2X_2 \leq 10$

                $X_1, X_2 \geq 0$

4. An electronic equipment contains 1000 resistors. When any resistor fails, it is
    replaced with a cost of Rs. 8/- individually.if all resistors are replaced at same time,
    the cost per resistor is Rs. 2/-. The percentage surviving, S(i) at the end of month i is
    given below:

Month i	0	1	2	3	4	5	6
S(i)	100	96	89	68	37	13	0

    What is the optimum replacement plan?

5. a) Write about the terminoligies used in queuing system.

   b) A harbor has single dock to upload the containers from the incomming ships. The arrival rate of ships at the harbor follows Poisson distribution and unloading time for the ships follows exponential distribution and hence, the service rate also follows Poisson distribution. The arrival rate and the service rate are 8 ships per week and 14 ships per week, respectively. Find the following:

   i)   Utilization of the dock.

   ii) Average number of waiting ships in the queue.

   iii) Average waiting time per ship in the queue.

   iv) Average waiting time per ship in the system.

6. a) Define alternate optimum solution and unbounded solution.

   b) Maximise $Z = X_1 + 2X_2 + 3X_3$

   subject to $2X_1 - X_2 + X_3 \geq 4$

                  $X_1 + X_2 + 2X_3 \leq 8$

                  $X_2 - X_3 \geq 2$

                  $X_1, X_2, X_3 \geq 0$

7. a) Explain about geomeric programming approach.

   b) Minimise $f(x) = x^{-1} y^{-1/2} z^{-1} + 2.3\, xz + 4xyz$

   subject to $(1/3)\, X^{-2} Y^{-2} + (4/3)\, Y^{1/2} Z^{-1} \leq 1$

                  $X + 2Y + 3Z \leq 1$

                  $(1/2)\, X + Y = 0$

                  $X, Y \geq 0$

8. a) Explain about Stochastic programming. Write about conditional probability and conditional expectations.

   b) Optimisation techniques is a tool for decision suppourt system. Discuss.

<p align="center">********</p>

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular Examinations, January-2017

DIGITAL SYSTEM DESIGN & TESTING
(COMMON TO DECS & VLSI SYSTEM DESIGN)

Time: 3 Hours   Max Marks: 60
<div align="center">Answer any FIVE questions
All questions carry EQUAL marks</div>

1. (a) Draw the ASM Chart for D Flip-Flop   6 M
   (b) With an Example, explain how Determination of State Equivalence is done using an Implication Table.   6 M

2. (a) Explain about design of sequential circuits using PLA's   6 M
   (b) Design a Sequential Comparator for Binary Numbers   6 M

3. (a) With an Example ,Explain about Stuck at 0 Fault and Stuck at 1 Fault   6 M
   (b) Find the set of Test Vectors for X_2 for Stuck at 0 Fault and Stuck at 1 Fault by Boolean Difference Method   6M
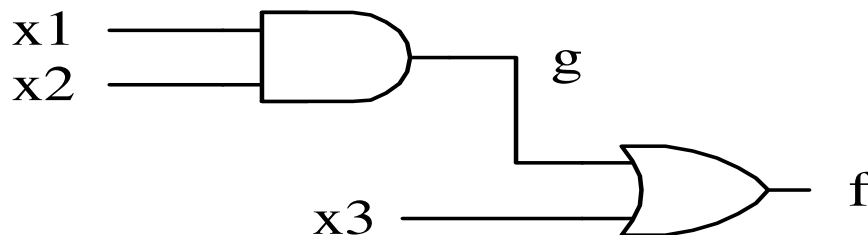
4. (a) What is the significance of Kohavi algorithm? With and Example Explain how it detects multiple faults in a two level networks   8 M
   (b) What is the need for going for Algorithms in Test Pattern Generation   4 M

5. (a) Explain about Signature Analysis   6 M
   (b) Explain about PODEM Algorithm.   6 M

6.   Draw the Homing Tree and Synchronising Tree for the Following State Table   12 M

PS	NS	
	X=0	X=1
A	B,0	D,0
B	A,0	B,0
C	D,1	A,0
D	D,1	C,0

7. (a) Describe the advantages of PLA minimization   4 M
   (b) With an Example explain about PLA Folding.   8 M

8. (a) Explain about races, cycles and hazards in connection with asynchronous sequential machine design   6 M
   (b) With respect to synchronous sequential machine design fundamental mode model   6 M

AR16 　　　　　　　　　　　　　　　　　 Set-01

Code: 16MPE1001

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular Examinations, January - 2017
ELECTRICAL MACHINE MODELING AND ANALYSIS
(PED)

Time: 3 Hours 　　　　　　　　　　　　　　　　　　　　　　 **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks

1.a) What are the essentials of rating machine and conventions. 　　　　　　　　6M

b) Derive the Voltage and Torque equations for Kron's primitive machine. 　　　6M

2. Explain the transient analysis of separately excited DC motor. 　　　　　　12M

3. Obtain the voltage and torque equation for Induction motor in synchronously rotating reference model. 　　　　　　　　　　　　　　　　　　　　　　　　　　　12M

4. Explain and analyze the steady state operation of unsymmetrical two phase Induction machine. 　12M

5. Derive the equations for synchronous machine for self and mutual inductances. 　　12M

6. Write short notes on the following.

   a) Cross field theory of single phase induction machine. 　　　　　　　　6M

   b) Power Equivalence. 　　　　　　　　　　　　　　　　　　　　　6M

7. Define and obtain the equations for the critical clearing time. Explain the angle characteristics during

   a three phase fault at the terminals. 　　　　　　　　　　　　　　　　12M

8.a) Block diagram representation of dynamic modeling of the three phase induction motor. 　　8M

   b) Write down the fundamental assumptions required for the primitive machine. 　　4M

****

AR16

CODE: 16MCS1001   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January-2017

DATA STRUCTURES AND ALGORITHMS
COMPUTER SCIENCE ENGINEERING

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Write an algorithm for all operations of single linked lists.   7M

   (b) Define ADT . Explain about operations of stacks and queues.   5M

2. (a) Write procedure to create Heap.   6M

   (b) What are the steps to be taken to insert an element in to the Heap.   6M

3. (a) Explain multiplication and division methods to compute Hash function.   8M

   (b) Write brief note on rehashing methods.   4M

4. Explain how an AVL tree can be used to sort a sequence of n elements in O(n log n) time.   12M

5. Write and explain Prim's and Kruskal's algorithms with examples.   12M

6. Explain Strassen's Matrix multiplication. How it is different from standard matrix multiplication.   12M

7. (a) Write procedure to solve 8 Queen s Problem.   8M

   (b) What is meant by Minimum Cost Spanning Tree.   4M

8. Write short notes for the following a) Hamiltonian Cycle   4M

   (b) Graph Coloring   c) Greedy Method.   4M+4M

****

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January-2017

ADVANCED MATHEMATICS
(STRUCTURAL ENGINEERING)

Time: 3 Hours   Max Marks:60

<div align="center">

Answer any FIVE questions
All questions carry EQUAL marks

</div>

1. (a) Solve $3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$, $u(x,0) = 4e^{-x}$ using method of separation of variables.   6M

   (b) Solve the one dimensional heat-flow equation, using the conditions $u(0,t) = 0$, $u(l,t) = 0$ and $u(x,0) = lx - x^2$, $0 \le x \le l$.   6M

2. An infinitely long plane uniform plate is bounded by two parallel edges and an end at right angles to them. The breadth is π; this end is maintained at a temperature u_0 at all points and other edges are at zero temperature. Determine the temperature at any point of the plate in the steady- state.   12M

3. Solve $\nabla^2 u = 0$ under the conditions $(h=1, k=1), u(0,y) = 0, u(4,y) = 12 + y$ for $0 \le y \le 4$; $u(x,0) = 3x, u(x,4) = x^2$ for $0 \le x \le 4$.   12M

4. (a) A random sample of 100 teachers in a large 6M metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation Rs48. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between Rs.472 to Rs.502.

(b) Find 95% confidence limits for the mean of a normally 6M distributed population from which the following was taken 15,17,10,18,16,9,7,11,13 and 14.

5. In two large populations, there are 30 and 25 percent 12M respectively of fair haired people. Is this difference likely to be hidden in sample of 1200 and 900 respectively from the two populations.

6. Calculate the correlation coefficient and the lines of 12M regression from the following data:

x:	62	64	65	69	70	71	72	74
y:	126	125	139	145	165	152	180	208

7. Find the least squares regression equation of x_1 on x_2 12M and x_3 from the following data:

x_1:	3	5	6	8	12	14
x_2:	16	10	7	4	3	2
x_3:	90	72	54	42	30	12

8. Find the largest eigen value in modulus and the 12M corresponding eigenvector of the matrix A =
$\begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix}$ using the power method.