AR16 SET-02

Code: 16MTE1001

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December- 2018
OPTIMIZATION TECHNIQUES AND APPLICATIONS
(Thermal Engineering)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions
All questions carry equal marks

1. a. Explain the principles of optimality.
    b .Maximize $Z = 50x_1 + 100x_2$
    Subjected to $10x_1 + 5x_2 \leq 2500$.
    $\qquad\qquad\quad 4x_1 + 10x_2 \leq 2000$
    $\qquad\qquad\quad X_1 + 3/2\ x_2 \leq 450$.
    $\qquad\qquad\quad X_1, x_2 \geq 0$.

2. a. write the applications of dynamic programming.

    b. Using dynamic programming

    Minimize $y_1^2 + 2y_2^2 + 4y_3$.

    Subjected to $y_1 + 2y_2 + y_3 \geq 8$.
    $\qquad\qquad\quad y_1, y_2, y_3 \geq 0$.

3. Find the minimum of $f = \lambda^5 - 5\lambda^3 - 20\lambda + 5$

    using quadratic   interpolation method with starting point as 0 and step size is equal to
    0.5. Take €=0.1.

4. Use branch and bound technique to solve
    Minimize $3x_1 + x_2$
    Subjected to $2x_1 - x_2 \leq 6$.
    $\qquad\qquad\quad X_1 + x_2 \leq 4$.
    $\qquad\qquad\quad X_1, x_2 \geq 0$.

1 - 2

5. Solve the following mixed integer programming problem.

Maximise $6x_1+4x_2+5x_3$

Subjected to $x_1+3x_2+2x_3 \leq 14$.

$$3x_1+2x_2+2x_3 \leq 12$$
$$2X_1+x_2+3x_3 \leq 10$$
$$X_1,x_2, x_3 \geq 0.$$

6. a . What is geometric programming .

   b . Write about monomial approximation, iterative approximation .

   c . Applications of geometrical programming

7. a . Explain the application area of linear programming problems .

   b . How does correlation coffecient relates two random variables .

8. a. A company has to recruit a person as an employer from the list of 40 persons .20 of them are women and 20 are men. 10 of them knowing about CAD software and 30 of them not. 15 of them are having work experience and 25 are fresher's .what is the probability of the company to recruit a person knowing CAD software with previous work experience .

   b) Given the following probability distribution :

x :	0	1	2	3	4	5	6	7
P(x) :	0	2λ	2λ	λ	3λ	λ^2	$2\lambda^2$	$7\lambda^2+\lambda$

Find λ and Evaluate $P(x \geq 5)$ and $P(x<4)$.

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

Answer any FIVE questions
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1.a) Explain the basic two pole representation of commutator machine.   6M

  b) Explain Clark and Park transformation.   6M

2.a) Derive transfer function model for separately excited DC motor.   6M

  b) Draw the two axis representation for series, shunt, compound motor.   6M

3. Derive the two axis model for induction motor.   12M

4. Explain two axis representation for synchronous machine   12M

5. Explain the dynamic performance of the synchronous machine during a sudden change in input

   torque.   12M

6. Develop the small signal flow graph model for the induction motor.   12M

7. Explain the equal area criteria for Input torque change and three phase fault.   12M

8. Write short notes on the following.

  a) Stator reference frame.   3M
b) Rotor reference frame.   3M

c) Synchronously rotating reference frame.   3M
d) Phase transformation.   3M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
**I M.Tech. I Semester Supplementary Examinations, December- 2018**
DIGITAL SYSTEM DESIGN & TESTING
(VLSI System Design)

Time: 3 Hours   Max Marks:60
Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Draw an ASM Chart that has three input variables (D, E, F), four output variables   8 M
         (P, Q, R, S), and two exit paths. For this block, output P is always 1, and Q is 1 if
         D = 1. If D and F are 1 or if D and E are 0, R = 1 and exit path 2 is taken. If (D = 0
         and E = 1) or (D = 1 and F = 0), S = 1 and exit path 1 is taken.
    (b) What are the guidelines of State Assignment   4 M

2. (a) Explain about design of sequential circuits using ROM's   6 M
    (b) Explain about design of sequential circuits using FPGA   6 M

3. (a) Explain about bridging faults and intermittent faults.   6 M
    (b) Find the test vectors for the following Boolean Expression.   6 M
         $F= X_1X_2+X_1X_3'X_4'+X_2X_4$ to find SA0 and SA1 faults of the using Kohavi
         algorithm.

4. (a) What are the Disadvantages of Boolean Difference Method   4 M
    (b) Derive by the path sensitization method the test vectors for SA-0 and SA-1 faults at   8 M
         g and h in the network.
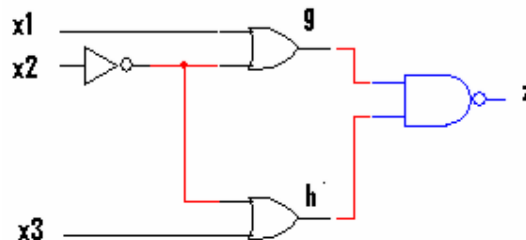
5. (a) Explain about Random Testing   5 M
    (b) With an Example , explain how Test Patterns are generated using D Algorithm   7 M

6. (a) Draw the Successor Tree for the Following State Table   6M

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

    (b) With an Example ,explain how uncertainty can be founded for State Machine   6M

7.   Apply PLA minimization procedure and obtain the minimized expression to be   12 M
         implemented on PLA. F = 2021 + 0022 + 1200.

8. (a) With an example, explain about Flow Table in connection with asynchronous   6 M
         sequential machine design
    (b) With an example, explain about State Reduction in connection with asynchronous   6M
         sequential machine design

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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I M.Tech. I Semester Regular & Supplementary Examinations, December- 2018

DATA STRUCTURES AND ALGORITHMS

(Computer Science and Engineering)

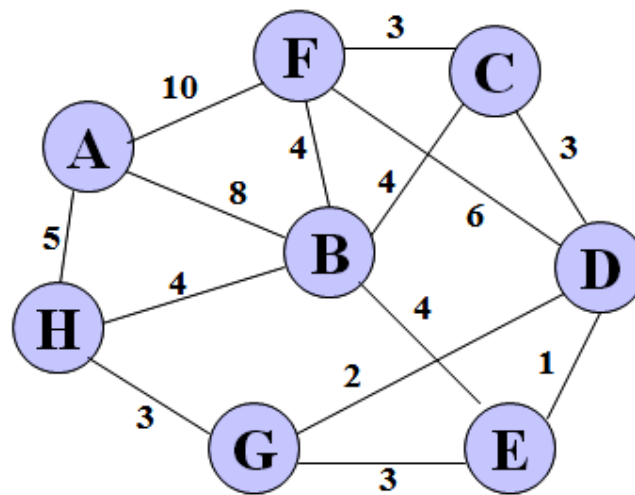**Time: 3 hours**   **Max.Marks:60**

Answer any FIVE Questions

All Questions carry equal marks

1. Define a stack. Describe the stack ADT.   12M

2. a) Write the Algorithm for Quick sort and Explain with an example.   7M
   b) Derive the Time Complexity for Quick Sort. 5M

3. Explain Kruskal's Algorithm for finding minimum cost spanning tree.   12M

4. Define AVL Trees. Explain the Insertions and Deletions in AVL Trees.   12M

5. a) Write briefly about Sets.   5M
   b) What is Hashing? Explain open addressing techniques.   7M

6. Write an algorithm for Knapsack problem by Dynamic Programming and Find out an optimal solution for the following instance.   12M
   Knapsack of capacity $W = 5$
   $w_1 = 2, v_1=12$
          $w_2 = 1, v_2=10$
          $w_3 = 3, v_3=20$
          $w_4 = 2, v_4=15$

7. a) Explain Job Sequencing with deadlines and Solve the Job Sequencing problem given n= 5, profits (P1,P2,P3,P4,P5) = (1,5,20,15,10) and corresponding deadlines (1,2,4,1,3) using Greedy Strategy.　　　　　　　　　　　　　　7M

    b) Explain about Strassen's Matrix Multiplication.　　　　　　　5M

8. a) Write briefly about Hamiltonian Cycle.　　　　　　　　　　6M

    b) Write Warshall's Algorithm　　　　　　　　　　　　　6M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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I M.Tech. I Semester Regular & Supplementary Examinations, December- 2018

ADVANCED MATHEMATICS
(Structural Engineering)

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. Solve $4\dfrac{\partial u}{\partial x}+\dfrac{\partial u}{\partial y}=3u$ and $u=e^{-5y}$ when $x=0$ for all values of y **12M**

2. The ends A and B of a rod of 20cm long have the temperature at $30°C$ and $80°C$ **12M**
    until steady state prevails. The temperature of the ends are changed to $40°C$ and $60°C$
    respectively. Find the temperature distribution in the rod at time t.

3. Solve $\dfrac{\partial u}{\partial t}=\dfrac{\partial^2 u}{\partial x^2}$ in $0<x<5,\ t\geq 0$, given that $u(x,0)=20, u(0,t)=0, u(5,t)=100$ **12M**
    Compute u for the time step with $h=1$ by Crank-Nicolson method

4. (a) If the mean of breaking strength of copper wire is 575 lbs with a standard deviation   **6M**
         of 8.3 lbs. How large a sample must be used in order that there will be one chance
         in 100 that the mean breaking strength of the sample is less than 572 lbs.
    (b) A random sample of size 100 is taken from a population with standard deviation   **6M**
         5.1. Given that the sample mean is 21.6. Construct a 95% confidence interval for
         the population mean.

5. (a) The means of two random samples of sizes 9 and 7 are 196.42 and 198.82   **6M**
         respectively. The sums of the squares of the deviations from the mean are 26.94
         and 18.73 respectively. Can the sample be considered to have been drawn from the
         same normal population at 5% level of significance?
    (b) In an investigation on two machines, the performance results are given as follows   **6M**

	No. of units perfect	No. of units defect
Machine 1	375	17
Machine 2	450	22

    Using Chi-square Test, check whether there is any significant performance of two
    machines at 5% level of significance

6. In the following table are recorded data showing the test scores made by salesmen   **12M**
    on an intelligence test and their weekly sales

Salesman	1	2	3	4	5	6	7	8	9	10
Test scores x	40	70	50	60	80	50	90	40	60	60
Sales y	2.5	6.0	4.5	5.0	4.5	2.0	5.5	3.0	4.5	3.0

    Calculate the regression line of sales on test scores and estimate the most probable
    weekly sales volume if a salesman makes a score 70

7. Find the correlation coefficient between x and y from the following data   **12M**

x	78	89	97	69	59	79	68	57
y	125	137	156	112	107	138	123	108

8. Compute the largest Eigen value and the corresponding eigenvector of the matrix   **12M**
    $$\begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$