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Question Paper Code :

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
M.E/M.Tech I-Semester Regular Examinations, November 2015
ADVANCED OPTIMIZATION TECHNIQUES
(MACHINE DESIGN)

Date:

Time: 3 hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT-I

- Explain Primal-Dual Relationships in Geometric Programming? 6M
 - Minimize $f = X_2 + 6X_1^{-2}X_2^{-2}$? 6M

OR
- Using Geometric programming find the dimensions of an open rectangular tank that give a minimum surface area if the capacity of the tank equal to 1000 ft³ ? 6M
 - Explain Complimentary Geometric programming? 6M

UNIT-II

- Explain the Principle of Optimality? 6M
 - Solve the following LPP Using dynamic programming: 6M
Maximize $Z = 3x_1 + 7x_2 + 5x_3$
Subjected to $x_1 + 3x_2 + 2x_3 \leq 6$
 $x_1 + x_2 + x_3 \leq 5$, $x_1, x_2, x_3 \geq 0$

OR
- Explain the problem of dimensionality in Dynamic programming? 6M
 - Maximize $f(x_1, x_2) = 50x_1 + 100x_2$ 6M
Subjected to $10x_1 + 5x_2 \leq 25$
 $4x_1 + 10x_2 \leq 2000$
 $x_1 + 1.5x_2 \leq 450$, $x_1, x_2, x_3 \geq 0$

UNIT-III

- Solve the problem Using Gomory's Cutting plane method: 12M
Maximize $Z = 8x_1 + 5x_2$
Subject to $x_1 + x_2 \leq 6$, $9x_1 + 5x_2 \leq 45$, $x_1, x_2 \geq 0$
OR

6. Solve the following Using Bala's' Method: 12M

$$\text{Minimize } f = x_1 + x_2 + 2x_3 + 3x_4$$

$$\text{Subject to } x_2x_3 + x_4 \leq 1, x_1 + x_2x_3 + 2x_4 \leq 3, x_i = 0 \text{ or } 1, i=1,2,3,4$$

UNIT-IV

7. An automobile body is assembled using a large number of spot welds. the number of defective welds (X) closely follows the distribution

$$P(X=d) = e^{-2} 2^d / d!, d=0,1,2,\dots$$

Find the probability that the number of defective welds is less than or equal to 2. 12M

OR

8. The absolute value of the velocity of a molecule in a perfect gas (v) obeys the Maxwell's' distribution 12M

$$F_v(v) = 4h^3 v^2 e^{-h^2v^2} / \sqrt{\pi}$$

Where $h^2 = (m/2KT)$ is a constant (where m is the molecule is Boltzmann Constant and T is the Absolute temperature) find the mean and standard deviation of the velocity of a molecule ?

UNIT-V

9. Explain Simulated Annealing with flow chart? Mention the advantages of SA over GA? 12M

OR

10. a) Explain Goal programming (graphical) Method? 6M
b) Explain Network based optimization? 6M