Code No: C8905 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I SEMESTER EXAMINATIONS, APRIL/MAY-2012
OPTIMIZATION TECHNIQUES AND APPLICATIONS
(ENGINEERING DESIGN)

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

Answer any five questions
All questions carry equal marks

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1. $Min\ Y = 25600\lambda^4 + 16\lambda^2 - 8\lambda + 1$ using Quadratic interpolation method. Take step size as 0.1. Show calculations only for two cycles.

2.a) Define gradient of a function. Explain why is it called steepest ascent direction?

b) Using Steepest decent method $Min\ f(X) = x_1^2 + x_2^2 - 2x_1 - 4x_2 + 5$. Take a starting point as a [0, 0]. Show calculations only for two iterations.

3.a) State the arithmetic-geometric inequality theorem and using it derive dual problem for unconstrained geometric problem.

b) $Min\ f(x) = 16x_1x_2x_3 + 4x_1x_2^{-1} + 2x_2x_3^{-2} + 8x_1^{-3}x_3$ where $x_i > 0$

4. Find the shortest path from A to E in the following network using Dynamic Program

	B1	B2	B3
A	2	2	2

	C1	C2
B1	3	4
B2	4	-
B3	5	2

	D1	D2
C1	-	2
C2	5	3

	E1
D1	3
D2	4

5. Consider the following LPP

$Max\ Z = 2x_1 + x_2 + 4x_3 - x_4\ st$

$x_1 + 2x_2 + x_3 - 3x_4 \le 8, -x_1 + x_3 + 2x_4 \le 0, 2x_1 + 7x_2 - 5x_3 - 10x_4 \le 21, x_i \ge 0$

a) Solve the LPP by Simplex method
b) Find the effect of change b to [3,-2, 4].

Contd…2

6.a) Define Simulation. Explain the characteristics of various types of simulation models.

b) The daily demand of shakun Bread shows the following frequency distributions

Daily demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.5	0.12	0.02

Simulate the demand for next 5 days with the sequence of random numbers of 48,78,19,51,56.

7. Solve the following ILPP by branch-bound method

$Max\ Z = 2x_1 + 3x_2$

$s.t\ 6x_1 + 5x_2 \le 25,\ x_1 + 3x_2 \le 10,\ x_i \ge 0$

and integers.

8.a) The width of a slot on duralumin forging is normally distributed. The specification of the slot width is 0.900±0.005. The parameters μ = 0.9 and σ = 0.003 are known from the past experience in production process. What is the % of scarp forgings?

b) Write about the chance constrained algorithm.

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