Code: 9A02709

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

OPTIMIZATION TECHNIQUES

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the difference between constraint surface and a composite constraint surface.

(b) State and explain the linear programming problem in a standard form.

2 Solve the following problem using Kuhn-tucker conditions:

$$\text{Maximize } f(x_1, x_2) = 2x_1 + x_2 - x_1^2$$

$$\text{Subject to } 2x_1 + 3x_2 \leq 6$$

$$2x_1 + x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

3 Solve the following L.P. problem using simplex method:

$$\text{Maximize } Z = 3x_1 + 5x_2 + 4x_3$$

$$\text{Subject to } 2x_1 + x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

$$x_1, x_2, x_3 \geq 0$$

4 Determine the optimal solution for the following transportation problem:

		To			**Supply**
	5	2	4	3	**22**
From	4	8	1	6	**15**
	4	6	7	5	**8**
Demand	**7**	**12**	**17**	**9**	

5 Find the minimum of the function $f = \lambda^5 - 5\lambda^3 - 20\lambda + 5$ by the Fibonacci method in the interval (0, 5).

6 Minimize $f = 2x_1^2 + x_2^2$ from the starting point (1, 2) using the univariate method (two iterations only).

7 Consider the problem:

$$\text{Maximize } f(x_1, x_2) = \frac{1}{3}(x_1 + 1)^3 + x_2$$

$$\text{Subject to } g_1(x_1, x_2) = 1 - x_1 \leq 0$$

$$g_2(x_1, x_2) = -x_2 \leq 0$$

Construct the Φ_k function according to the interior penalty function approach and complete the minimization of Φ_k.

8 Explain the computational procedure used in dynamic programming.

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