Code: 9A02709 **R09**

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2016

OPTIMIZATION TECHNIQUES

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What is optimization? Give engineering applications of optimization.
(b) Classify optimization problems and explain briefly with suitable examples.

2 (a) State the various methods available for solving a multivariable optimization problem with equality constraints.
(b) Consider the following problem:
Minimize $f(x) = {x_1}^2 + {x_2}^2 + {x_3}^2$
Subject to constraints
$x_1 + x_2 + x_3 \geq 5$
$2 - x_2 x_3 \leq 0$ and $x_1,\ x_2 \geq 0,\ x_3 \geq 2$
Determine whether the Kuhn-Tucker conditions are satisfied at the following point (2, 1, 2).

3 (a) State an LP problem in standard form.
(b) Solve the following problem by simplex method:
Maximize $Z = x + 3y$
Subject to constraints
$-4x + 3y \leq 12$
$x + y \leq 7$
$x - 4y \leq 2,\ x, y \geq 0$

4 Find the optimum solution to the following transportation problem for which the cost, origin availabilities and destination requirements are as given below.

		To					Availability
		A	B	C	D	E	
From	O_1	3	4	6	8	8	20
	O_2	2	10	1	5	30	30
	O_3	7	11	20	40	15	15
	O_4	2	1	9	14	18	13
Requirements		40	6	8	18	6	

5 Find the minimum of $f(x) = x^5 - 5x^3 - 20x + 5$ by using the quadratic interpolation method.

6 Minimize $f(x_1, x_2) = x_1 - x_2 + 2{x_1}^2 + 2x_1 x_2 + {x_2}^2$ starting from the point (0, 0) by using steepest decent method.

7 Minimize $f(x_1, x_2) = \frac{1}{3}(x_1 + 1)^3 + x_2$
Subject to $g_1(x_1, x_2) = -x_1 + 1 \leq 0$
$g_2(x_1, x_2) = -x_2 \leq 0$. By using the interior penalty function method.

8 (a) Explain the dynamic programming problem.
(b) Minimize $Z = {y_1}^2 + {y_2}^2 + {y_3}^2$ subject to $y_1 + y_2 + y_3 \geq 15$ and $y_1, y_2, y_3 \geq 0$.

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