S.46

Code No.: 9A05603/R09

B.Tech. III Year II Semester Regular and Supplementary Examinations **Set-4**

April/May - 2013

OPTIMIZING TECHNIQUES

(Common to CSE and CSS)

Time: 3 Hours Max. Marks: 70

*Answer any **FIVE** Questions*

*All Questions carry **Equal** Marks*

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1. An experimenter has obtained the following equation to describe the trajectory of a space capsule:
   $f(x) = 4x^3 + 2x - 3x^2 + e^{x/2}$.
   Determine a root of the above equation.

2. Find the relative extreme of $(x_1^2 - 2x_1 + 4x_2^2 - 8x_2)$.

3. (a) What is the difference between slack, surplus and artificial variables? How do they differ in their structure and use?
   (b) What is the difference between a feasible solution, a basic feasible solution and an optimal solution of a linear programming problem?

4. Determine the optimal solution for the following transportation problem.

		To			Supply
		3	8	5	5
From		5	5	3	8
		7	6	9	7
		4	9	5	14
Demand		7	9	18	

5. (a) State the Kuhn–Tucker conditions.
   (b) The profit per acre of a farm is given by: $20x_1 + 26x_2 + 4x_1x_2 - 4x_1^2 - 3x_2^2$.
   Where x_1 and x_2 denote, respectively, the labour cost and the fertilizer cost. Find the values of x_1 and x_2 to maximize the profit.

6. What is penalty function concept? Explain interior penalty function algorithm.

7. Consider the non-linear programming problem
   Minimize $f(x) = x_1^{-1} + x_2^{-1}$.
   subject to $h(x) = \frac{1}{2}x_1^2 + x_2^2 - 1 = 0$
   $x_1, x_2 \geq 0$
   Construct a full quadratic approximation to the problem at the point $x^0 = \left(\frac{3}{4}, \frac{3}{4}\right)$.

8. State the Bellman's principle of optimality and explain by an illustrative example how it can be used to solve multi-stage decision problems.