Code No.: 9A05603/R09

B.Tech. III Year II Semester Regular and Supplementary Examinations **Set-1**

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. State whether each of the followings functions is convex, concave, or neither,

   (i) $f(x) = e^x$

   (ii) $f(x) = \frac{1}{x^2}$.

2. Minimize the function $f(x) = 0.65 - [0.75(1 + x^2)] - 0.65x \tan^{-1}(1/x)$ using the golden section method with n = 6.

3. Solve the following LP problem using graphical method and give your comment on the result,

   Maximize $Z = 5X_1 + 4X_2$

   Subject to $X_1 - 2X_2 \le 1$

   $X_1 + 2X_2 \ge 3$

   $X_1, X_2 \ge 0$.

4. Four new machines M_1, M_2, M_3 and M_4 are to be installed in a machine shop. There are five vacant places A, B, C, D and E available. Because of limited space, machine M_2 cannot be placed at C and M_3 cannot be placed at A. C_{ij}, the assignment cost of machine i to place j in rupees is shown below,

	A	B	C	D	E
M_1	4	6	10	5	6
M_2	7	4	–	5	4
M_3	–	6	9	6	2
M_4	9	3	7	2	3

   Find the optimum assignment schedule.

5. Explain the economic interpretation of Lagrangian multiplier method and derive the Kuhn-Tucker conditions for the non-linear programming problem.

6. (a) Why is handling of equality constraints difficult in the penalty function methods? (b) What is the difference between the interior and extended interior penalty function methods?

7. Solve the following problem using direct quadratic approximation method,

Minimize $f(x) = 6x_1x_2^{-1} + x_2x_1^{-2}$

subject to $h(x) = x_1x_2 - 2 = 0$

$g(x) = x_1 + x_2 - 1 \geq 0$

From the initial feasible estimate $x^0 = (2,1)$.

8. A ship is to be loaded with stock 3 items. Each unit of item has a weight w_i and value r_i. The maximum cargo weight the shop can is 5 and the details of the three items are as follows,

Items (i)	Weight (w_i)	Value (r_i)
1	1	15
2	3	40
3	2	60

Find the most valuable cargo load without exceeding the maximum cargo weight by using dynamic programming.