B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2016

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 Determine the minimum of:

$f(x) = (10x^3 + 3x^2 + x + 5)^2$

Starting at $x = 2$ and using a step size Δ = 0.5 using quadratic point estimation method.

2 Minimize $f = 2x_1^2 + x_2^2$ by using the Cauchy method with the starting point (1, 2) (two iterations only).

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

Maximize $Z = 40\ X_1 + 100\ X_2$

Subject to $2\ X_1 + X_2 \leq 500$

$2\ X_1 + 5\ X_2 \leq 1000$

$X_1, X_2 \geq 0$

4 Find the optimal solution for the following transportation problem. The cell entries represent the unit transportation cost in rupees from each origin to each destination.

		Destination				
		D_1	D_2	D_3	D_4	Availability
Origin	O_1	1	2	1	4	20
	O_2	3	3	2	1	40
	O_3	4	2	5	9	20
	O_4	5	3	6	10	20
Demand		4	7	6	13	

5 Write the Kuhn-Tucker conditions for the following problem and solve it:

Minimize $Z = x_1^2 + x_2^2 + x_3^2$

subject to constraints: $2x_1 + x_2 \leq 5$

$x_1 + x_3 \leq 2$

$1 - x_1 \leq 0$

$2 - x_2 \leq 0$

$x_3 \geq 0$

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

7 (a) Explain the concepts of “branching” and “bounding” used in the branch and bound algorithm.

(b) What is the meaning “Fathoming” a node? Under what conditions can a node be fathomed in the branch and bound algorithm?

8 Draw the network diagram from the following activities and find critical path and total float and free float of activities.

Job	A	B	C	D	E	F	G	H	I	J	K
Job time	13	8	10	9	11	10	8	6	7	14	18
Immediate predecessor	-	A	B	C	B	E	D, F	E	H	G, I	J