Code: 9A05603

R09

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2014/2015

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 (a) What is an inflection point and how do you identify it?

(b) What is the unimodal property? What is its significance in single variable optimization?

2 Given the function: $f(x_1, x_2) = 100(x_2 - x_1^2) + (1 - x_1)^2$ and $x^{(0)} = [-1.2, 1]^T$ $x^{(1)} = [-1.3, 1.07]^T$. The first two points in a search for x^*, the minimum of f. calculate the search direction at $x^{(1)}$ using the Fletcher-Reeves gradient-based method.

3 Solve the following LP problem using simplex method and comment on the result:

Maximize $Z = 2X_1 + 3X_2$

$-X_1 + 2X_2 \leq 4$

$X_1 + X_2 \leq 6$

$X_1 + 3X_2 \leq 9$

$X_1, X_2 \geq 0$

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

		Warehouse				Supply
		W_1	W_2	W_3	W_4	
Factory	F_1	14	25	45	5	6
	F_2	65	25	35	55	8
	F_3	35	3	65	15	16
Demand		4	7	6	13	

5 Solve the non-linear programming problem:

optimize $Z = 4x_1^2 + 2x_2^2 + x_3^2 - 4x_1x_2$

subject to the constraints $x_1 + x_2 + x_3 = 15$

$2x_1 - x_2 + 2x_3 = 20$.

6 (a) Explain method of multipliers algorithm.

(b) Describe briefly differences between the MOM and other transformation methods such as SUMT.

7 Solve the following problem using direct quadratic approximation method:

Minimize $f(x) = x_1 x_2$

subject to $h(x) = 6x_1 x_2^{-1} + x_2 x_1^{-2} - 5 = 0$

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

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

8 (a) Distinguish between PERT and CPM.

(b) A mother notes that when her teenaged son uses the telephone, he takes no less than 10 minutes for a call and sometimes as much as one hour. Twenty-minute calls are more frequent than calls for any other duration. If son's phone call were an activity in a PERT project:

(i) What would be the phone call's expected duration?

(ii) What would be its variance?

(iii) In scheduling the project, how much time would be allocated for the phone call?

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