Code No: C0707, C4306 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I SEMESTER EXAMINATIONS APRIL/MAY-2012
OPERATIONS RESEARCH
(COMMON TO ELECTRICAL POWER SYSTEMS, POWER ELECTRONICS)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1. Solve the LPP problem by Big M method:

$Max\ Z = 4x_1 + 5x_2 - 3x_3 + 50$

$st\ x_1 + x_2 + x_3 = 10$

$x_1 - x_2 \geq 1$

$2x_1 + 3x_2 + x_3 \leq 40 \quad x_i \geq 0 \forall i$

2.a) What is meant by a degeneracy in Transportation problem?

b) A product is produced by four factories A, B, C and D. The unit production costs in them are Rs.2, Rs.3, Rs.1 and Rs.5 respectively. Their production capacities are: Factory A-50 units, B-70 units, C-30 units and D-50 units. These factories supply the product to four stores, demands of which are 25, 35,105 and 20 units respectively. Unit transport cost in rupees from each factory to each store is given in the table below.

Stores / Factories	1	2	3	4
A	2	4	6	11
B	10	8	7	5
C	13	3	9	12
D	4	6	8	3

Determine the extent of deliveries from each of the factories to each of the stores so that the total production and transportation cost is minimum.

3. Six jobs are to be processed on three machines A, B, C with the order of processing jobs as ACB.

Job	U	V	W	X	Y	Z
Proc,time on machine A	12	10	9	14	7	9
Proc,time on machine B	7	6	6	5	4	4
Proc,time on machine C	6	5	6	4	2	4

The suggested sequence is Y-W-Z-V-U-X. Find out the elapsed time for the sequence suggested. Is it optimal? If it is not optimal, then find out the optimal sequence and the minimum total elapsed time associated with it.

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4.a) State the dominance principle.

b) Solve the following game by using the principle of dominance:

4	2	0	2	1	1
4	3	1	3	2	2
4	3	7	-5	1	2
4	3	4	-1	2	2
4	3	3	-2	2	2

5. Find the shortest path from vertex A to B along arcs joining various vertices lying between A to B .Length of each path is given in the table.

	B	E	H
A	7	6	5

	C	F	I
B	3	4	-
E	6	7	10
H	-	7	10

	D	G	J
C	9	7	-
F	7	6	5
I	-	4	3

	K
D	3
G	9
J	8

6.a) Mention the characteristics of Fibonacci method.

b) Min $f = x^2-10e^{0.1x}$ in the interval (-10, 5) to the accuracy of 10%. Use Fibonacci Method. Calculate the actual accuracy achieved.

7. Using Hook-Jeeves method, Min $Y = 2+(x_1^2-x_2)^2+x_2^2$. Take starting point as (-3,-4), $\Delta x_1 = \Delta x_2 = 0.5$. Show calculations for complete two cycles.

8.a) Define Simulation. Explain the characteristics of various types of simulation models.

b) State and explain the advantages and disadvantages of simulation.

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