21/3/12

Prelim Examination 2011-12

CLASS : TYBMS **SUB : OPERATIONS RESEARCH**

Time : 2 hrs. Marks : 60

N.B.: (i) Section I is compulsory. (ii) Answer any three questions from Section II. (iii) Support your answers with diagrams/illustrations wherever necessary.

SECTION – I

1. Answer the following questions briefly:- (10)

(a) State the advantages of decision tree.

(b) State the importance of project crashing.

(c) Comment on Regret Matrix in Assignment Problem.

(d) What is a prohibited transportation problem?

(e) Explain the term Sensitivity Analysis.

2.(a) Maximize $Z = 10x1 + 5x2$ subject to

$4x1 + 5x2 \leq 100$

$5x1 + 2x2 \leq 80$

$X1 \geq 0, x2 \geq 0$ (10)

2. (b) Baroda lather shop has three manufacturing plants and four sales outlets. Data of daily demand at various sales outlets and supply from various plants along with transportation cost per unit between plants and sales outlets are given in the following table. Determine the Initial Basic Feasible Solution (IBFS) by using (i) North West Corner Rule (ii) Least Cost Method (iii) Vogel's Approximation Method. (10)

SECTION –II

3. Solve the following LPP using dual and interpret the optimal solution. (10)

Minimize $Z = x1+x2$

Subject to $0.12x1+0.04x2 \geq 600$

$0.10x1+0.40x2 \geq 1000$

$X1 \geq 0, x2 \geq 0$

P.T.O.

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4.Divya Bhaskar newsgroup wants to allocate four desktop publishing operators for four different jobs. Each operator is independently capable of handling any of the given jobs. The rate to be paid per 100 pages of typing (depending on the efficiency of the operator for each different job) is given in the following table. (10)

Jobs	Operator1	Operator2	Operator3	Operator4
A	48	48	50	44
B	56	60	60	68
C	96	94	90	85
D	42	44	54	46

Find the optimal allocation of jobs and operators in such a way that total payment made to the operators would be minimum. Also find the total payment made per page of typing.

5. Draw a network corresponding to the following and determine the earliest and the latest allowable start and finish time for each of the activities, the critical path and project duration, the total free, interfering and independent float for each of the activities. (10)

Activity	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Duration (Days)	3	4	14	10	5	4	6	1	1

6. The following table gives optimistic (a), pessimistic (b) and most likely (m) durations in days for a project. (10)

Activity	1-2	1-3	1-4	2-3	2-5	3-4	3-6	4-6	5-6
A	2	4	4	1	3	6	3.5	2	0.5
M	3	6	7	3	6	9	5	4	2
B	4	8	10	5	9	12	6.5	6	3.5

7. A newspaper seller supplies a certain magazine to his customers on demand. Based on his experience he believes that he can sell between 10 to 13 copies of the magazine. The magazine can be purchased at Rs.20 each and can be sold at Rs.25 each. Magazines that are not sold can be returned to the publisher for refund of 50%. (10)
   (a) Construct the payoff matrix.
   (b) Determine the best decision from the standpoint of (i) Maximin criteria (ii) Maximax criteria (iii) Hurwicz criteria using alpha = 0.4 (iv) Minimax regret criteria (v) Laplace criteria