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Total No. of Pages : 03

Total No. of Questions : 07

BCA (2010 Batch) (Sem.-5)
OPERATIONS RESEARCH

Subject Code : BC-504

Paper ID : [B0222]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and a student has to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Basic Feasible Solution
- b) Unbounded Solution
- c) Degeneracy in linear Programming and how is it removed.
- d) Opportunity Loss Table
- e) Maximax Criterion
- f) Decision making under Risk
- g) Decision Tree
- h) Uses of Integer Programming
- i) Relationship between Primal and Dual
- j) Assumptions of Transportation Problems

SECTION-B

2. Explain in detail various phases of solving a problem using Operations Research.
3. Find the dual of the given LP problem, solve the dual and interpret the solution :

$$\text{Minimize } z = 4x + 20y$$

$$\text{Subject to : } 4x + 40y \geq 160$$

$$3x + 10y \geq 60$$

$$4x + 5y \geq 40$$

$$x, y \geq 0$$

4. A manufacturer has three plants x , y and z which supply to the distributors located at P,Q,R,S and T. Monthly plant capacities are 80, 50 and 90 units respectively. Monthly requirements of distributors are 40, 40, 50, 40 and 80 units respectively. Unit transportation costs are given below in Rupees :

From/To	P	Q	R	S	T
X	5	8	6	6	3
Y	4	7	7	6	6
Z	8	4	6	6	3

Determine the optimal distribution for the company in order to minimise the total transportation cost.

5. A salesman has to visit five cities A,B,C,D and E. The inter city distances are tabulated below :

From/To	A	B	C	D	E
A	–	12	24	25	15
B	6	–	16	18	7
C	10	11	–	18	12
D	14	17	22	–	16
E	12	13	23	25	–

Which route would you advice him to take so that total distance travelled by him is minimised?

6. A firm X wants to determine how many units of product Y to be stocked on daily basis. Following pattern of demand has been generated :

Units Sold/day	180	181	182	183	184	185	186
No. of days	2	8	10	40	20	15	5

The product left unsold at the end of day must be disposed off. The cost price of the product Y is Rs. 6 per unit and it is sold at a price of Rs.8 per unit, whereas the shortage cost is Rs. 3 per unit. Determine the action associated with the maximum expected profit and EVPI.

7. A firm produces two products A and B which are equally profitable. The company has entered into contract to supply 40 units of A and 20 units of B per week to another company. The technology implies that production of A must always be at least as large as of B. There are two raw material constraints to be satisfied :

$$5A + 8B \leq 400 \text{ and}$$

$$55A + 50B \leq 2750$$

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Formulate LP Problem and solve it.