Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 03

Total No. of Questions : 07

B.Tech. (Ind. Engg. & Mgt.) (Spl. in TQM)PT   (Sem.–5)

OPERATIONS RESEARCH

Subject Code : IEM-502
M.Code : 70993

Time : 3 Hrs.   Max. Marks : 40

INSTRUCTIONS TO CANDIDATES :

1. **Attempt EIGHT out of TEN questions from SECTION-A carrying TWO marks each.**

2. **Attempt any FOUR out of SIX questions from SECTION-B carrying SIX marks each.**

SECTION-A

1. **Answer briefly :**

    a. Discuss the significance and scope of OR.

    b. Write objective function of LPP.

    c. What do you mean by surplus variables?

    d. Write assumptions of LPP.

    e. What is a balanced transportation problem?

    f. How can we deal with unbalanced assignment problem?

    g. Write applications of queuing theory.

    h. Explain the significance of safety stock in inventory management.

    i. Write various types of inventory.

    j. What is waiting line problem?

SECTION-B

2. Corporation has three manufacturing plants shipping to three warehouses. The production of plants (in thousands of units), requirement of the warehouses (in thousands of units), and shipping cost (in Rs.) per unit each source to each warehouse is given below:

Plants	Production	Warehouse	Requirements
P1	140	W1	180
P2	130	W2	140
P3	110	W3	70

The freight rate per unit from each plant warehouse is :

		W1	W2	W3
FROM	P1	1.80	1.40	1.60
	P2	2.00	1.80	2.60
	P3	1.40	1.20	3.20

Determine the initial basic feasible schedule using the Lowest-Cost Method.

3. B Sahni Chartered accountant firm has four chartered accountants each whom can be assigned any of the three audit assignments. Because of the varying work experience of the chartered accounts, the net surplus (professional fees minus expenses to be incurred by the CA firm) varies as under :

Chartered Accountant	Audit Assignments		
	W	X	Y
A	65	78	83
B	85	52	59
C	83	56	69
D	49	80	85

You are required to find the maximum net surplus which can be obtained.

4. What are the situations where operations research techniques will be applicable?

5. The annual consumption of the material is 10,000 units ordering costs are Rs. 7.00 per order, price per unit of material is 30 paise and storage cost are 15% per annum of stock value. Calculate Economic Order Quantity.

6. Vitamins A & B are available in two different foods P & Q. One unit of P contains 2 units of vitamin A and 3 units of vitamin B. One unit of Q contains 5 units of Vitamin A and four units of Vitamin B. The minimum daily consumption of vitamin A and B should be 1000 and 1500 units respectively. One unit of P costs Rs. 5 and one unit of Q costs Rs. 6. What should be the intake of p & Q in order to minimize cost?

7. Discuss the four costs associated in developing an inventory model.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.