M.Com. New CBCS Pattern Semester-I
PCC1E10 - Operation Research

* 7 2 6 4 *

––

1. a) Briefly explain the characteristics, objectives and scope of Operations Research. Also discuss three Operations Research Models. **16**

OR

b) M/s. Rahul and Company Ltd. are the manufacturers of Lamps. The following are the details of their operation during 2022: **16**

       Cost of lamps `1000 per lamp

         Average monthly market demand 2,000 lamps

       Ordering cost `200 per order

       Inventory carrying cost 20% per annum.

Normal usage 100 lamps per week minimum usage 50 lamps per week

Maximum usage 200 lamps per week Lead time to supply 4-6 weeks

Compute from the above:

i) Economic order quantity

ii) If the supplier is willing to supply quarterly 1,500 units at a discount of 10%, is it worth accepting?

iii) Maximum level of stock.

iv) Minimum level of stock.

v) Re-order level of stock.

2. a) Explain the concept of transportation model and comparison between transportation model and General Liner. **16**

OR

b) Four factories, A, B, C and D produce sugar and the capacity of each factory is given below: Factory A produces 10 tons of sugar and B produces 8 tons of sugar, C produces 5 tons of sugar and that of D is 6 tons of sugar. The sugar has demand in three markets X, Y and Z. The demand of market X is 7 tons, that of market Y is 12 tons and the demand of market Z is 4 tons. The following matrix gives the returns the factory can get, by selling the sugar in each market. Formulate a transportation problem and solve for maximizing the returns. **16**

Profit in Rs. per Tons (X100) market

Factories	X	Y	Z	Availability in tons
A	4	3	2	10
B	5	6	1	8
C	6	4	3	5
D	3	5	4	6
Requirement in Tons	7	12	4	

3. a) Explain the differences and similarities between Assignment problem and Transportation problem. **16**

<div align="center">OR</div>

b) A company has five jobs V, W, X, Y and Z and five machines A, B, C, D and E. The given matrix shows the return in Rs. of assigning a job to a machine. Assign the jobs to machines so as to maximize the total returns. **16**

<div align="center">Machines
Returns in Rs.</div>

Jobs	A	B	C	D	E
V	5	11	10	12	4
W	2	4	6	3	5
X	3	12	5	14	6
Y	6	14	4	11	7
Z	7	9	8	12	5

4. a) Explain the application of sequencing model. Mention different types of sequencing problem you come across. **16**

<div align="center">OR</div>

b) A machine operator has to perform three operations, namely plane turning, step turning and taper turning on a number of different jobs. The time required to perform these operations in minutes for each operating for each job is given in the matrix given below. Find the optimal sequence, which minimizes the time required. **16**

Job	Time for plane turning in minutes	Time for step turning in minutes	Time for taper turning in minutes
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

5. Write short notes. **4x4**

a) Inventory Model

b) North – West corner method

c) Hungarian method

d) Factors to be considered for Replacement.

<div align="center">**********</div>