POST-GRADUATE COURSE

Term End Examination — June, 2022/December, 2022
COMMERCE (Old Syllabus)
Paper-VIII : QUANTITATIVE TECHNIQUES
(Up to January 2021 Enrolment Session)

Time : 2 hours]   [Full Marks : 50

Weightage of Marks : 80%

Special credit will be given for accuracy and relevance in the answer. Marks will be deducted for incorrect spelling, untidy work and illegible handwriting. The weightage for each question has been indicated in the margin.

Use of scientific calculator is strictly prohibited.

Module - I

Answer any *two* of the following questions : $12\frac{1}{2} \times 2 = 25$

1. (a) What is Operations Research ? Briefly discuss its origin and development. $2 + 4\frac{1}{2}$

   (b) Discuss the scope of Operations Research.   6

2. (a) What is Linear Programming ? Discuss the features of Linear Programming. $2\frac{1}{2} + 4$

   (b) Suppose a manufacturing firm wants to produce Chair and Table using two inputs – labour and wood. To produce one unit of either Chair or Table, one unit of labour is required and the total availability of labour is 5 units. Further, each unit of Chair requires 2 units of material and each unit of Table requires 3 units of wood. The total available supply of wood is 12 units. The firm wishes to maximise profit from the production of two products – Chair and Table. Profit per unit of Chair is Rs. 5/- and that per unit of Table is Rs. 6/-. Formulate this problem in the form of an L.P.   6

3. (a) What is Transportation Problem ? Discuss different transportation methods for finding initial solutions.   2½ + 4

(b) Suppose a company has factories at four different places (denoted by F_1, F_2, F_3, and F_4) which supply to warehouses W_1, W_2, W_3, W_4, and W_5. Monthly factory capacities are 40, 30, 20 and 10 respectively. Monthly warehouse requirements are 30, 30, 15, 20 and 5 respectively. Unit shipping costs (in rupees) are given below. Determine the optimum distribution i.e., the total number of allocations to minimize total shipping cost.

To Warehouse		W_1	W_2	W_3	W_4	W_5	Supply (Unit)
From Factories	F_1	7	6	4	5	9	40
	F_2	8	5	6	7	8	30
	F_3	6	8	9	6	5	20
	F_4	5	7	7	8	6	10
Demand (Unit)		30	30	15	20	5	

6

4. (a) Discuss mathematical statement of assignment problem.   6½

(b) What is Hungarian method of solution ? Discuss with steps.   6

Module - II

Answer any *two* of the following questions :   12½ × 2 = 25

5. (a) What is two-person zero-sum game ? Discuss with some basic terms.   7½

(b) Distinguish between finite and infinite games.   5

6. (a) What is Project Management ? Discuss the advantages of Network Analysis.   2 + 6½

(b) What do you mean by critical path analysis in project management ?   4

7. (a) An engineering factory consumes 5,000 units of a component per year. The ordering, receiving and handling costs are Rs. 300/- per order while the trucking cost are Rs. 1,200/- per order. Interest cost is Rs. 0.06 per unit per year, Deterioration and obsolescence cost is Rs. 0.004 per unit per year, Storage cost is Rs. 1,000/- per year for 5,000 units. Calculate the economic order quantity.   6½

    (b) A contractor has to supply 20,000 units per day. He can produce 30,000 units per day. The cost of holding a unit in stock is Rs. 3/- per year and the setup cost per run is Rs. 50/-. How frequently and of what size, the production runs be made ?   6

8. Write short notes on any *four* of the following :   3⅛ × 4

    (a) Game Theory

    (b) Saddle Point of a Function

    (c) Floats and Slack Times

    (d) PERT Analysis

    (e) Inventory Management

    (f) Lead time.

————————