II Semester M.Com. Examination, June 2015
(Semester Scheme)
COMMERCE
Paper – 2.5 : Operations Research and Quantitative Techniques

Time : 3 Hours   Max. Marks : 80

SECTION – A

1. Answer **any ten** of the following in about **3-4** lines **each**. **Each** sub-question carries **two** marks.   **(10×2 = 20)**

   a) What is Linear Programming ?

   b) Define CPM.

   c) What is Initial Basic Feasible Solution ?

   d) What do you mean by EOQ ?

   e) Define an Objective function.

   f) What are concurrent activities ?

   g) What are contradictory constraints ?

   h) What is one-to-one assignment ?

   i) Define a 'slack variable'.

   j) What is sensitivity analysis ?

   k) What is error of redundancy ?

   l) What are iconic models ?

SECTION – B

Answer **any three** of the following :   **(3×5 = 15)**

2. What is an Assignment problem ? Explain with an illustration.

P.T.O.

3. What is Resource Allocation in Project Management ? What are the phases of resource allocation ?

4. Define Inventory Management. Explain the significance of Inventory Models with shortages.

5. An aptitude test for selecting officers in a bank was conducted on 1,000 candidates, the average score is 42 and the standard deviation of scores is 24.

   Assuming normal distribution for the scores, find ;

   a) the no. of candidates whose scores exceed 58

   b) the no. of candidates whose scores lie between 30 and 66.

6. The Infotech Company Ltd. manufactures two products A and B. These products are processed on the machine. It takes 20 minutes to process one unit of product A and 15 units for each unit of Product B and machine operates for a maximum of 80 hours in a week. Product A requires 3 kg and product B, 2 kg of the raw material per unit, the supply of which is 1,200 kg per week. Market constraint on product B is known to be 1,500 units every week. If the product A costs Rs. 10 per unit and can be sold at price of Rs. 15, product B costs Rs. 15 per unit and can be sold in the market at a unit price of Rs. 22, the problem is to find out the number of units of A and B that should be produced per week in order to maximize the profit. Formulate the problem as linear programming model.

SECTION – C

Answer **any three** of the following. **Each** question carries **15** marks. **(15×3 = 45)**

7. Explain the simplex procedure used in solving an L.P. Model.

8. Solve the following problem using graphical method.

   Maximize 'Z' = $5x_1 + 3x_2$ (Subject to constraints)

   $$x_1 + x_2 \leq 6$$
   $$2x_1 + 3x_2 \geq 3$$
   $$x_1 \leq 3$$
   $$x_2 \leq 3$$
   $$x_1, x_2 > 0$$

9. Solve the following transportation problem by matrix minimum method and compute the total transportation cost :

Plants	Warehouse				Supply
	W_1	W_2	W_3	W_4	
P_1	23	42	33	11	2
P_2	17	25	45	20	3
P_3	3	12	8	18	12
Demand	4	1	5	7	17

10. Find the optimum solution to the following transportation problem using VAM (Vogel's Approximation Method) for which the cost, origin availabilities and destination requirements are given below.

To		A	B	C	D	E	Availability
From	I	3	4	6	8	8	20
	II	2	10	1	5	30	30
	III	7	11	20	40	15	15
	IV	2	1	9	14	18	13
Requirement		40	6	8	18	6	78

11. A Project Schedule has the following characteristics.

   From the above information, you are required to

Activity	1–2	1–3	2–4	3–4	3–5	4–9	5–6	5–7	6–8	7–8	8–10	9–10
Time (Days)	4	1	1	1	6	5	4	8	1	2	5	7

1) Construct a network diagram.
2) Compute the earliest event time and latest event time.
3) Determine the critical path and total project duration.
4) Compute total free, float, for each activity.

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