PG – 533

# II Semester M.Com. Degree Examination, July 2017
## (CBCS)
## COMMERCE
## Paper – 2.5 : Operation Research and Quantitative Techniques

Time : 3 Hours Max. Marks : 70

### SECTION – A

1. Answer **any seven** of the following sub-questions in about **3-4** lines **each**. **Each** sub-question carries **two** marks : **(7×2=14)**
   a) Define linear programming.
   b) What is non-degenerate Basic Feasible Solution ?
   c) What do you mean by model with one price break ?
   d) What do you mean by probability ?
   e) Define the term capital budgeting.
   f) What do you mean by Independent Float ?
   g) Define Operational Research.
   h) What do you mean by decision tree analysis ?
   i) State the uses of EOQ.
   j) What is EMV under Decision Theory ?

### SECTION – B

Answer **four** of the following in about **one page**. **Each** question carries **5** marks : **(4×5=20)**

2. "PERT provides the framework with which a project can be described, scheduled and the controlled" – Discuss.

3. 12 'one rupee' coins are distributed at random among 5 beggars A, B, C, D and E. Find the probability that :
   i) They get 4, 2, 0, 5 and 1 coins respectively
   ii) Each beggar gets at least two coins and
   iii) None of them goes empty handed.

P.T.O.

4. Explain the different types of risks faced by the entrepreneur regarding capital budgeting.

5. In a plant layout, four different machines M1, M2, M3 and M4 are to be erected in a machine shop. There are five vacant areas A, B, C, D and E. Because of limited space, Machine M2 cannot be erected at area C and Machine M4 cannot be erected at area A. The cost of erection of machines is given below :

| Machines \ Area | A | B | C | D | E |
|---|---|---|---|---|---|
| M1 | 4 | 5 | 9 | 4 | 5 |
| M2 | 6 | 4 | – | 0 | 3 |
| M3 | 4 | 5 | 8 | 5 | 1 |
| M4 | – | 2 | 6 | 1 | 2 |

6. Explain what is meant by probability distribution of a random variable ? How is it useful in decision making ?

7. Geetha Perfume Company produces both perfumes and body spray from two flower extracts F1 and F2. The following data is provided :

| | Liters of Extract | | |
|---|---|---|---|
| | **Perfume** | **Body Spray** | **Daily Availability (ltrs)** |
| Flower Extract, F1 | 8 | 4 | 20 |
| Flower Extract, F2 | 2 | 3 | 8 |
| Profit per litre (Rs.) | 7 | 5 | |

The maximum daily demand of body spray is 20 bottles of 100 ml each. A market survey indicates that the daily demand of body spray cannot exceed that of perfume by more than 2 litres. The company wants to find out the optimal mix of perfume and body spray that maximizes the total daily profit. Formulate the problem as a linear programming model.

## SECTION – C

Answer **any three** of the following. **Each** question carries **12** marks : **(3×12=36)**

8. What is decision making under uncertainty ? Describe the methods which are useful for decision-making under uncertainty.

9. Solve the following LPP by graphical method :

Minimize $Z = 18x_1 + 12x_2$

Subject to constraints,

$2x_1 + 4x_2 \leq 60$

$3x_1 + x_2 \geq 30$

$8x_1 + 4x_2 \geq 120$

Where $x_1, x_2 \geq 0$.

10. Draw the network for the following project given in Table below :

| Activity | Preceded by Initial activity | Duration (weeks) |
|---|---|---|
| A | – | 10 |
| B | A | 9 |
| C | A | 7 |
| D | B | 6 |
| E | B | 12 |
| F | C | 6 |
| G | C | 8 |
| H | F | 8 |
| I | D | 4 |
| J | g, h | 11 |
| K | E | 5 |
| L | I | 7 |

Number the events by Fulkerson's rule and find the critical path. Also find the time for completing the project.

11. What is Monte Carlo simulation ? Explain how simulation is useful in solving queuing and inventory problems.

12. Determine an initial basic feasible solution for the following TP, using the least cost method.

| | $D_1$ | $D_2$ | $D_3$ | $D_4$ | Supply |
|---|---|---|---|---|---|
| $O_1$ | 6 | 4 | 1 | 5 | 14 |
| $O_2$ | 8 | 9 | 2 | 7 | 16 |
| $O_3$ | 4 | 3 | 6 | 2 | 5 |
| Demand | 6 | 10 | 15 | 4 | 35 |