



**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 :

		<b>Area</b>				
		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>M1</b>	[	4	5	9	4	5
<b>M2</b>	[	6	4	–	0	3
<b>Machines M3</b>	[	4	5	8	5	1
<b>M4</b>	[	–	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 :

<b>Liters of Extract</b>			
	<b>Perfume</b>	<b>Body Spray</b>	<b>Daily Availability (ltrs)</b>
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 :

$$\begin{aligned} \text{Minimize } Z &= 18x_1 + 12x_2 \\ \text{Subject to constraints, } & 2x_1 + 4x_2 \leq 60 \\ & 3x_1 + x_2 \geq 30 \\ & 8x_1 + 4x_2 \geq 120 \\ & \text{Where } x_1, x_2 \geq 0. \end{aligned}$$

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.

	<b>D<sub>1</sub></b>	<b>D<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>D<sub>4</sub></b>	<b>Supply</b>
<b>O<sub>1</sub></b>	6	4	1	5	14
<b>O<sub>2</sub></b>	8	9	2	7	16
<b>O<sub>3</sub></b>	4	3	6	2	5
<b>Demand</b>	6	10	15	4	35

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