

MCM234 - Research Methodology & Operational Techniques Paper-IV

P. Pages : 2

Time : Three Hours

**GUG/S/19/1033**

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw well labelled diagram wherever necessary.
 3. Avoid vague answers.

1. Either

- a) What are the different steps in developing research proposal. **8**
- b) Define research design. Write feature of research design. **8**

OR

- c) What is Research ? List different types of Research. **8**
- d) Describe sampling ? Explain the importance of sampling. **8**

2. Either

- a) Give definition of quantitative techniques what are its advantages ? **8**
- b) Fit the regression equation of x on y and y on x from the following data : **8**

x	10	20	30	40	50	60
y	15	5	10	25	30	40

Obtain the estimate of y when x = 22.

OR

- c) Explain the meaning and objective of quantitative techniques. **8**
- d) Given below is the distribution of profit in thousand rupees earned by 100 book shops in Maharashtra. Find out Mean and Median. **8**

Profit (Rs.)	20	30	40	50	60	70	80	90
No. of Book Shop	5	15	29	50	71	86	97	100

3. Either

- a) Explain North-West corner method for solving transportation problem. **8**
- b) Solve following LPP using **8**
 Minimize $Z = 4x_1 + 6x_2 + 18x_3$
 Subject to $x_1 + 3x_2 \geq 3$
 $x_2 + 2x_3 \geq 5$
 $x_1, x_2 \text{ and } x_3 > 0$

OR

c) Explain in detail the concept of Linear Programming. 8

d) Consider the problem of assigning five operators to machines. 8

	Operators				
	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	8	3	6
C	10	7	2	2	2
D	5	11	9	7	12
E	7	9	10	4	12

Assign the operator to different machines so that cost is minimized.

4. Either

a) Explain the essential features of a queueing system. 8

b) Each unit of an item cost a company Rs.40. Annual holding cost are 18% of unit cost for interest charges, 1% for insurance, 2% allowances for obsolescence Rs.2 for building overhead, Rs.1.50 for damage and loss and Rs.4 miscellaneous cost. Annual demand for the item is constant at 1000 units and each order cost Rs.100 to place. Calculate EOQ and total cost associated with stocking the item. 8

OR

c) Define the following : 8

i) Holding cost

ii) Setup cost

iii) Shortage cost

iv) Lead time

d) A barber with one man shop takes exactly 25 minutes to complete one hair cut. If customers arrives in a Poisson fashion at an average rate of one every 40 minutes, how long on the average must a customer wait for service ? 8

5. Solve all the question.

a) Explain Research Approaches. 4

b) Write a note on Regression Analysis. 4

c) Explain Resource levelling and smoothing. 4

d) What is the use of Random Number. 4
