

CBCS SCHEME



USN

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16/17MBA14

First Semester MBA Degree Examination, June/July 2019 Quantitative Methods

Time: 3 hrs.

Max. Marks:80

- Note:** 1. Answer any **FOUR** full questions from Q.No.1 to 7.
2. Q.No. 8 is compulsory.
3. Use of Probability distribution is permitted

- 1 a. What is normal distribution? Write the formula to calculate its probability. (02 Marks)
b. Name the various measures of central tendency. Explain the desired qualities of an ideal measure of central tendency. (06 Marks)
c. Compute Arithmetic Average, Median and Mode from the following data:

| | | | | | | | | |
|--------------------|-------|--------|---------|---------|---------|---------|---------|---------|
| Weight in kg | 93-97 | 98-102 | 103-107 | 108-112 | 113-117 | 118-122 | 123-127 | 128-132 |
| Number of students | 3 | 5 | 12 | 17 | 14 | 6 | 3 | 1 |

(08 Marks)

- 2 a. What is correlation? Distinguish between positive and negative correlation with suitable examples. (02 Marks)
b. If 5% of the electric bulbs manufactured by a company are defective. Use Poisson distribution to find the probability that in a sample of 100 bulbs
i) None is defective ii) 5 bulbs will be defective. (06 Marks)
c. From the prices X and Y of shares A and B respectively given below, state which share is more stable in value. (08 Marks)

| | | | | | | | | | | |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Price of share A(X) | 55 | 54 | 52 | 53 | 56 | 58 | 52 | 50 | 51 | 49 |
| Price of share B(Y) | 108 | 107 | 105 | 105 | 106 | 107 | 104 | 103 | 104 | 101 |

- 3 a. What do you mean by Regression Analysis give any two uses of it? (02 Marks)
b. In a binomial distribution with 6 independent trials, the probability of 3 and 4 successes is found to be 0.2457 and 0.0819 respectively. Find the parameters 'p' and 'q' of the binomial distribution. (06 Marks)
c. From the following data calculate Spearman's rank correlation coefficient after making adjustment for tied ranks: (08 Marks)

| | | | | | | | | | | |
|---|----|----|----|---|----|----|----|----|----|----|
| x | 48 | 33 | 40 | 9 | 16 | 16 | 65 | 24 | 16 | 57 |
| y | 13 | 13 | 24 | 6 | 15 | 4 | 20 | 9 | 6 | 19 |

- 4 a. Define Dummy activity. What is the purpose of introducing dummy activity? (02 Marks)
b. Discuss the difference between decision making under certainty and risk. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



- c. The following table shows the number of motor registrations in a certain territory for a term of 5 years and the sale of motor tyres by a firm in that territory for the same period. Find the regression equation to estimate the sale of tyres when motor registration is known. Estimate the sale of tyres when registration is 850. (08 Marks)

| Year | Motor registration | Number of tyres sold |
|------|--------------------|----------------------|
| 1 | 600 | 1250 |
| 2 | 630 | 1100 |
| 3 | 720 | 1300 |
| 4 | 750 | 1350 |
| 5 | 800 | 1500 |

- 5 a. What is Bayesian decision rule? (02 Marks)
 b. What are the common errors in drawing networks? (06 Marks)
 c. Anita electric company produces two products P_1 and P_2 . Products are produced and sold on weekly basis. The weekly production cannot exceed 25 for product P_1 and 35 for product P_2 because of limited available facilities. The company employs total of 60 workers. Product P_1 requires 2 man-weeks of labour, while P_2 requires one man-week of labour. Profit margin on P_1 is Rs.60 and on P_2 is Rs.40. Formulate this problem as linear programming problem and solve that using graphical method. (08 Marks)
- 6 a. Explain infeasibility with suitable example. (02 Marks)
 b. A set of examination marks is approximately normally distributed with a mean of 75 and standard deviation of 5. If the top 5% of students get A grade and the bottom 25% get grade F. What mark is the lowest A and what mark is the highest F? (06 Marks)
 c. The data on normal time and cost along with crashed time and cost associated with a project are shown in the following table:

| Activity | Immediate Predecessor | Normal | | Crash | |
|----------|-----------------------|--------------|---------------|--------------|---------------|
| | | Time (weeks) | Cost (Rs'000) | Time (weeks) | Cost (Rs'000) |
| A | - | 10 | 20 | 7 | 30 |
| B | - | 8 | 15 | 6 | 20 |
| C | B | 5 | 10 | 4 | 14 |
| D | B | 6 | 11 | 4 | 15 |
| E | B | 8 | 9 | 5 | 15 |
| F | E | 5 | 5 | 4 | 8 |
| G | A, D, C | 12 | 3 | 8 | 4 |

71,000

The indirect cost is Rs.400 per day. Find the optimum duration and associated minimum project cost. (08 Marks)

- 7 a. What is linear programming? List its advantages. (02 Marks)
 b. An assembly is to be made from two parts X and Y. Both parts must be turned on a Lathe. Y must be polished whereas X need not be polished. The sequence of activities, together with their predecessors is given below.

| Activity | A | B | C | D | E | F | G | H |
|----------------------|-----------------|--------------------|--------------------|-----------------|-----------------|----------|-------------------|------|
| Description | Open work order | Get material for X | Get material for Y | Turn X on lathe | Turn Y on lathe | Polish Y | Assemble X hand Y | Pack |
| Predecessor Activity | - | A | A | B | B, C | E | D, F | G |

Draw a network diagram of activities for the project. (06 Marks)



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- c. For a project consisting of several activities the durations and required resources for carrying out each of activities and their availabilities are given below:

Resources availability:

- i) Operators = 50
- ii) Equipment X = 1, Y = 1 and Z = 1

| Activity | Equipment | Operators | Duration (days) |
|----------|-----------|-----------|-----------------|
| 1-2 | X | 30 | 4 |
| 1-3 | Y | 20 | 3 |
| 1-4 | Z | 20 | 6 |
| 2-4 | X | 30 | 4 |
| 2-5 | Z | 20 | 8 |
| 3-4 | Y | 20 | 4 |
| 4-5 | Y | 20 | 4 |
| 4-5 | X | 30 | 6 |

- i) Draw the network, identify critical path and compute the total float for each of the activities.
 - ii) Find the project completion time under the given resource constraints. (08 Marks)
- 8 a. A manufacturer wants to ship 22 loads of his product as shown below. The matrix gives the kilometers from sources of supply to the destinations.

| | | Destination | | | | | Supply |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| | | D ₁ | D ₂ | D ₃ | D ₄ | D ₅ | |
| Source | S ₁ | 5 | 8 | 6 | 6 | 3 | 8 |
| | S ₂ | 4 | 7 | 7 | 6 | 5 | 5 |
| | S ₃ | 8 | 4 | 6 | 6 | 4 | 9 |
| | Demand | 4 | 4 | 5 | 4 | 8 | 22 25 |

The shipping cost is Rs.10 per load per kilometer. What shipping schedule should be used in order to minimize the total transportation cost? (08 Marks)

- b. A dairy firm has 3 plants located in a state. The daily milk production at each plant is as follows:

Plant 1: 6 million liter; Plant 2 : 1 million liter; Plant 3 : 10 million liter.

Each day the firm must fulfil the needs of its 4 distribution centres. The minimum requirement of each centre is as follows:

Distribution centre 1: 7 million liter

Distribution centre 2 : 5 million liter

Distribution centre 3 : 3 million liter

Distribution centre 4 : 2 million liter

Cost in (hundreds) of rupees of shipping 1 million liter from each plant to each distribution centre is given in the following table:

| | | Distribution Centre | | | |
|-------|----------------|---------------------|----------------|----------------|----------------|
| | | D ₁ | D ₂ | D ₃ | D ₄ |
| Plant | P ₁ | 2 | 3 | 11 | 7 |
| | P ₂ | 1 | 0 | 6 | 1 |
| | P ₃ | 5 | 8 | 15 | 9 |

Find initial basic feasible solution by

- i) Northwest corner rule method
- ii) Vogel's approximation method.

(08 Marks)
