

- c. Find Karl Pearson's coefficient of correlation from the following series of marks secured by 10 students in class test in Mathematics and Statistics. (08 Marks)

| | | | | | | | | | | |
|----------------------|----|----|----|----|----|----|----|----|----|----|
| Marks in Mathematics | 45 | 70 | 65 | 30 | 90 | 40 | 50 | 75 | 85 | 60 |
| Marks in Statistics | 35 | 90 | 70 | 40 | 95 | 40 | 60 | 80 | 80 | 50 |

- 4 a. What are Decision Trees? (02 Marks)
 b. Calculate Standard deviation and Coefficient of variation from the following data :

| | | | | | | | | |
|-------------------------|----|----|----|----|-----|-----|-----|-----|
| Age under (in year) | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| Number of Persons dying | 15 | 30 | 53 | 75 | 100 | 110 | 115 | 125 |

Here total number of persons dying is 125. (06 Marks)

- c. Solve the following problem by using Graphical method.

$$\text{Minimize } Z = 3x_1 + 5x_2$$

$$\text{Subject to } -3x_1 + 4x_2 \leq 12$$

$$2x_1 + 3x_2 \geq 12$$

$$2x_1 - x_2 \geq -2$$

$$\text{and } x_1 \leq 4 ; x_2 \geq 2 ; x_1, x_2 \geq 0.$$

- 5 a. Write Poisson formula with Mean and Variance. (02 Marks)
 b. Explain what do you mean by Decision Making :
 i) Under certainty ii) Under uncertainty. (06 Marks)
 c. Draw a network corresponding to the following information :

| | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Activity | 1-2 | 1-3 | 2-6 | 3-4 | 3-5 | 4-6 | 5-6 | 5-7 | 6-7 |
| Duration | 4 | 6 | 8 | 7 | 4 | 6 | 5 | 19 | 10 |

- i) Draw a network ii) Obtain early and late start time and completion time
 iii) Determine the critical path. (08 Marks)
 6 a. Define Random Variable with example. (02 Marks)
 b. Determine an IBFS to the following transportation problem using NWCR.

| | | | | | |
|----------------------|----------------|----------------|----------------|----------------|--------|
| Origin / Destination | D ₁ | D ₂ | D ₃ | D ₄ | Supply |
| 01 | 6 | 4 | 1 | 5 | 14 |
| 02 | 8 | 9 | 2 | 7 | 16 |
| 03 | 4 | 3 | 6 | 2 | 5 |
| Demand | 6 | 10 | 15 | 4 | 35 |

- c. What is "Decision Theory"? Explain the steps of Decision Making process. (08 Marks)
 7 a. What are the advantages of Critical Path Method? (02 Marks)
 b. Find Mode for the continuous series.

| | | | | | | | |
|-----------|-----|-------|-------|-------|-------|-------|-------|
| Class | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 |
| Frequency | 2 | 5 | 3 | 4 | 10 | 6 | 2 |

- c. Discuss the 4 project scheduling techniques. (08 Marks)
 8 **CASE STUDY (Compulsory) :**

A small maintenance project contains of the following jobs whose precedence relationships are given below :

| | | | | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Job | 1-2 | 1-3 | 2-3 | 2-5 | 3-4 | 3-6 | 4-5 | 4-6 | 5-6 | 6-7 |
| Duration days | 15 | 15 | 3 | 5 | 8 | 12 | 1 | 14 | 3 | 14 |

Find the floats for each activity and find the critical path and the total project duration.

(16 Marks)
