

**II B. TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, FEB - 2022**  
**PROBABILITY AND STATISTICS**  
 (Common CSE and INF)

Time : 3 Hours

Max. Marks : 60

**Note : Answer ONE question from each unit (5 × 12 = 60 Marks)**

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UNIT-I

1. a) From the following data find the mean profit. [6M]

|                       |         |         |         |         |         |         |         |
|-----------------------|---------|---------|---------|---------|---------|---------|---------|
| Profit's per shop(Rs) | 100-200 | 200-300 | 300-400 | 400-500 | 500-600 | 600-700 | 700-800 |
| No. of Shops          | 10      | 18      | 20      | 26      | 30      | 28      | 18      |

- b) Calculate the coefficient of Quartile deviation. [6M]

|       |      |       |       |       |       |       |        |
|-------|------|-------|-------|-------|-------|-------|--------|
| C.I   | 0-15 | 15-30 | 30-45 | 45-60 | 60-75 | 75-90 | 90-105 |
| $f_i$ | 8    | 26    | 30    | 45    | 20    | 17    | 4      |

(OR)

2. a) Calculate the median from the following data. [6M]

|           |       |       |       |       |       |        |
|-----------|-------|-------|-------|-------|-------|--------|
| Marks     | 10-25 | 25-40 | 40-55 | 55-70 | 70-85 | 85-100 |
| Frequency | 6     | 20    | 44    | 26    | 3     | 1      |

- b) Calculate the Karl Pearson's coefficient of skewness from the data. [6M]

|           |    |    |    |    |    |   |   |
|-----------|----|----|----|----|----|---|---|
| Size      | 1  | 2  | 3  | 4  | 5  | 6 | 7 |
| Frequency | 10 | 18 | 30 | 25 | 12 | 3 | 2 |

UNIT-II

3. a) Find the co-efficient of correlation from the following data. [6M]

|   |    |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|----|
| x | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| y | 12 | 11 | 13 | 15 | 14 | 17 | 16 | 19 | 18 |

- b) Fit an exponential function form for the following data [6M]

|   |    |    |    |    |    |
|---|----|----|----|----|----|
| x | 1  | 5  | 7  | 9  | 12 |
| y | 10 | 15 | 12 | 15 | 21 |

(OR)

4. a) Find the most likely production corresponding to a rainfall 40 from the following data: [6M]

|                            | Rain fall(X) | Production(Y) |
|----------------------------|--------------|---------------|
| Average                    | 30           | 500 Kgs       |
| Standard deviation         | 5            | 100 Kgs       |
| Coefficient of correlation | 0.8          |               |

- b) Determine the constants a and b by the method of least squares such that  $y = ae^{bx}$ . [6M]

|   |       |        |        |        |        |
|---|-------|--------|--------|--------|--------|
| x | 2     | 4      | 6      | 8      | 10     |
| y | 4.077 | 11.084 | 30.128 | 81.897 | 222.62 |

#### UNIT-III

5. a) Two dice are thrown, let X assign to each point ordered pair (a, b). X assigns the maximum of its numbers, i.e  $X(a, b) = \text{Max}(a, b)$ . Find the probability distribution. [6M]

- b) 1000 students had written an examination. Mean of test is 35 and standard deviation is 5. Assuming the distribution to be normal find how many students marks (i) Lie between 25 and 40 (ii) More than 40 (iii) Below 20. [6M]

(OR)

6. a) In a bolt factory machines A, B, C manufacture 20%, 30% 50% of the total of their outputs. 6%, 3% 2% are defective. A bolt is drawn at random and found to be defective, what is the probability that is manufactured by (i) Machine A (ii) Machine B (iii) Machine C. [6M]

- b) Find the value of standard deviation for the random variable defined as sum of the face values on throwing of 2 dice simultaneously. [6M]

#### UNIT-IV

7. a) A random sample of size 100 is taken from a population with standard deviation is 5.1. Given that the sample mean is 21.6. Construct confidence interval at the level of significance 95% also find the maximum error at the level of significance 99%. [6M]

- b) The mean height of the students in a college is 155 cm and standard deviation is 15. What is the probability that mean height of 36 students (i) less than 157 cm (ii) above 150 cm and also find the probable error. [6M]

(OR)

8. a) A population consisting of 5 numbers 2, 3, 6, 8, 11. Consider all samples of size '2' which can be drawn with replacement from this population. Find (i) Population mean (ii) Population standard deviation (iii) Mean of sampling distribution of means (iv) Standard deviation of sampling distribution of means (v) Correction factor (vi) Standard error and verify. [12M]

UNIT-V

9. a) In a large consignment of oranges a random sample of 64 oranges revealed that 14 oranges were bad. Is it reasonable to ensure that 20% of the oranges are bad? [6M]
- b) The following is the distribution of the hourly number of travels arriving at company ware house [6M]

|                      |    |     |     |     |    |    |   |   |   |
|----------------------|----|-----|-----|-----|----|----|---|---|---|
| Trucks arriving / hr | 0  | 1   | 2   | 3   | 4  | 5  | 6 | 7 | 8 |
| Blue                 | 52 | 151 | 130 | 102 | 45 | 12 | 5 | 1 | 2 |

Verify the arriving rate is true or not by using chi square test.

(OR)

10. a) Two independent samples of 8 and 7 items respectively had the following values of the variables [6M]

|           |    |    |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|----|----|
| Sample I  | 9  | 11 | 13 | 11 | 16 | 10 | 12 | 14 |
| Sample II | 11 | 13 | 11 | 14 | 10 | 8  | 10 | -  |

Does the estimates of population variances differ significantly?

- b) Three different machines are used for a production. On the basis of the outputs test whether the machines are equally effective using ANOVA. [6M]

| OUTPUTS   |            |             |
|-----------|------------|-------------|
| Machine I | Machine II | Machine III |
| 10        | 9          | 20          |
| 5         | 7          | 16          |
| 11        | 5          | 10          |
| 10        | 6          | 4           |

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