

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

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|-----|--|-----|----|----|
| 1 a | What is Primary and Secondary data in statistics? | CO1 | L1 | 2M |
| b | Define Kurtosis in statistics. | CO1 | L1 | 2M |
| c | Define Probability. | CO2 | L1 | 2M |
| d | Define expected value of a discrete random variable. | CO2 | L1 | 2M |
| e | State the formula for Binomial distribution. | CO3 | L1 | 2M |
| f | If the variance of a Poisson variate is 3, Find $(1 \leq X < 4)$? | CO3 | L2 | 2M |
| g | What is Point Estimation in Statistics? | CO4 | L1 | 2M |
| h | Define i) Null hypothesis ii) Alternative hypothesis. | CO4 | L1 | 2M |
| i | Define t-test for single mean. | CO5 | L1 | 2M |
| j | Write the formula for Chi-square test for goodness of fit. | CO5 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- 2 Calculate correlation coefficient to the following data:

| | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|
| X | 10 | 15 | 12 | 17 | 13 | 16 | 24 | 14 | 22 | 20 |
| Y | 30 | 42 | 45 | 46 | 33 | 34 | 40 | 35 | 39 | 38 |

OR

- 3 Find the regression line
- $y = a + bx$
- by the method of least squares for the following data

| | | | | | | | |
|---|----|----|----|----|----|----|----|
| X | 10 | 12 | 13 | 16 | 17 | 20 | 25 |
| y | 10 | 22 | 24 | 27 | 29 | 33 | 37 |

UNIT-II

- | | | | | |
|-----|---|-----|----|----|
| 4 a | A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the Probability that (i) 3 boys are selected (ii) Exactly 2 girls are selected | CO2 | L2 | 5M |
| b | If three coins are tossed. Find the probability of getting (i) 3 heads (ii) 2 heads only (iii) no heads | CO2 | L2 | 5M |

OR

- 5 A random variable X has the following probability function

| | | | | | | | | |
|------|---|---|----|----|----|----------------|-----------------|--------------------|
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| P(X) | 0 | K | 2K | 2K | 3K | K ² | 2K ² | 7K ² +K |

- Determine (i) K (ii) Evaluate
- $P(X \geq 6)$
- and
- $P(0 < X < 5)$
-
- (iii) if
- $P(X \leq K) > 1/2$
- , find the minimum value of K (iv) variance.

UNIT-III

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|-----|--|-----|----|----|
| 6 a | Derive mean of Binomial distribution. | CO3 | L2 | 5M |
| b | 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) one is defective (ii) $P(1 < x < 4)$ | CO3 | L2 | 5M |

OR

- 7 If X is a normal variate with mean 30 and standard deviation 5.
-
- Find i)
- $P(26 \leq X \leq 40)$
- and ii)
- $P(X \geq 45)$
- . CO3 L4 10M

UNIT-IV

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|-----|---|-----|----|----|
| 8 a | What is the maximum error one can expect to make with probability 0.9 when using the mean of a random sample of size $n=64$ to estimate the mean of population with $\sigma^2 = 2.56$ | CO4 | L3 | 5M |
| b | A random sample of size 100 is taken from a population with $\sigma = 5.1$. Given that the sample mean is $\bar{x} = 21.6$. Construct a 95% confidence interval for a population mean μ . | CO4 | L3 | 5M |

OR

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|-----|--|-----|----|----|
| 9 a | An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and variance of 16 minutes. Test the significance at 0.05 level | CO4 | L3 | 5M |
| b | Experience had shown that 20% of a manufactured product is of top quality. In one day's production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 level. | CO4 | L4 | 5M |

UNIT-V

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|------|---|-----|----|----|
| 10 a | A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard. | CO5 | L2 | 5M |
| b | Find the maximum difference that we can expect with probability 0.95 between the mean of samples of sizes 10 and 12 from a normal population if their standard deviations are found to be 2 and 3 respectively. | CO5 | L2 | 5M |

OR

- 11 The nicotine in milligrams of two samples of tobacco were found to be as follows.

| | | | | | | |
|----------|----|----|----|----|----|-----|
| Sample A | 24 | 27 | 26 | 21 | 25 | --- |
| Sample B | 27 | 30 | 28 | 31 | 22 | 36 |

Can it be said that the two samples have come from the same normal population.

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