

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

II - B. Tech II-Semester Regular Examinations (BR23), Apr/May - 2025

PROBABILITY AND STATISTICS

(Common to CSE, AIML Branches)

Time: 3 hours

Max. Marks: 70

*Question Paper consists of Part-A and Part-B
Answer ALL the question in **Part-A and Part-B**
Usage of Statistical Tables are allowed*

PART-A (10X2 = 20M)

- | | Marks | CO | BL |
|--|-------|-----|-----|
| 1. a) What is secondary data? | (2M) | CO1 | BL1 |
| b) Find the median of 5, 11, 35, 23, 42, 25, 17, 32. | (2M) | CO1 | BL2 |
| c) Three Electronic lamps are fitted in a room. Three bulbs are chosen at random from 10 bulbs having 6 good bulbs. What is the chance that the room is lighted? | (2M) | CO2 | BL4 |
| d) Given $P(A) = 0.35$, $P(B) = 0.40$ and $P(A \cap B) = 0.20$, Find $P(A \cup B)$ | (2M) | CO2 | BL3 |
| e) If $n = 40$, $\sigma = 2.06$ then find the maximum error with 99% confidence. | (2M) | CO3 | BL2 |
| f) If 2, 4, 7, 11, 15 is the given population, list all the possible samples of size 3 without replacement. | (2M) | CO3 | BL2 |
| g) For an F-distribution find $F_{0.05}$ with $v_1 = 7$ and $v_2 = 15$ | (2M) | CO4 | BL1 |
| h) Define Null Hypothesis in testing of hypothesis. | (2M) | CO4 | BL1 |
| i) Write the normal equations to fit a straight line. | (2M) | CO5 | BL1 |
| j) If the coefficients of regressions are given by 0.516 and 0.512 then find the coefficient of correlation. | (2M) | CO5 | BL3 |

PART-B (5X10 = 50M)

- 2 Calculate the mean and standard deviation for the following table giving the age distribution of 542 members.

Age (in years)	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	153	140	51	2

10(M) CO1 BL2

(OR)

- 3 Calculate Karl pearson's Coefficient of Skewness from the following data:

Site	1	2	3	4	5	6	7
Frequency	10	18	30	25	12	3	2

10(M) CO1 BL3

- 4a. In a bolt factory machines A, B, C manufacture 20%, 30%, 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. What is the probabilities that is manufactured by machines A, B and C?
- 5(M) CO2 BL3
- b. A hospital switch board receives an average of 4 emergency calls in a 10 minute interval. What is the probability that (i) there are at most 2 emergency calls in a 10 minute interval
- 5(M) CO2 BL3

(ii) there are exactly 3 emergency calls in a 10 minute interval

(OR)

- 5a. Fit a Binomial Distribution to the following data

5(M) CO2 BL3

X	0	1	2	3	4	5	6
f	13	25	52	58	32	16	4

- b. If a random variable has the probability density $f(x) = \begin{cases} 2e^{-2x}, & \text{for } x > 0 \\ 0, & \text{for } x \leq 0 \end{cases}$

5(M) CO2 BL5

Find (i) $P(1 < X < 3)$ (ii) $P(X > 0)$

6. A population consists of Six numbers **4, 8, 12, 16, 20, 24**. Consider all possible samples of size **two** which can be drawn **without** replacement.

10(M) CO3 BL2

Find i) The mean of the population

ii) The standard deviation of the population.

(OR)

- 7a. A random sample of 500 pineapples was taken from large consignment and 65 was found to be bad. Construct 99% confidence interval.

5(M) CO3 BL3

- b. If a 1-gallon can of paint covers on an average 513 square feet with a standard deviation of 31.5 square feet, what is the probability of that the mean area covered by a sample is of 40 of these 1-gallon cans will be anywhere from 510 to 520 square feet?

5(M) CO3 BL3

- 8a. An ambulance service claims that it takes on the average less than 10 min to reach its destination in emergency calls. A Sample of 36 calls, as a mean of 11 minutes, and the variance of 16 minutes. Test the significance at 0.01 level.

5(M) CO4 BL4

- b. A die was thrown 9000 times and of these 3220 yielded 3 or 4. Is this consistent with the hypothesis that the die was unbiased.

5(M) CO4 BL4

(OR)

9. Below given the weights on two diets A & B

10(M) CO4 BL4

Diet A	25	32	30	34	24	14	32	24	30	31	35	25			
Diet B	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22

Test if the two diets differ significantly as regards their effect on increase in weight.

10. Calculate the correlation coefficient for the following heights(in inches) of fathers (X) and their sons(Y):

10(M) CO5 BL2

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

(OR)

11. Fit a polynomial of the second degree to the form $y = a + bx + cx^2$ to the following data by the method of least squares:

10(M) CO5 BL3

x	0	1	2	3	4
y	1	0	3	10	21
