Code No.: MA402BS	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - December- 2025
COMPUTER ORIENTED STATISTICAL METHODS
(Common to CSE, IT, CSM)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) A continuous random variable has the pdf $f(x) = \begin{cases} kx, & for\ 0 < x < 1 \\ 0, & otherwise. \end{cases}$ [2M]
Find k.
b) A single card is drawn from an ordinary deck of 52 cards. Find the probability that the card is i) a king ii) Diamond iii) a red card. [2M]
c) A fair coin is tossed six times. Find the probability of getting four heads. [2M]
d) The mean and variance of a Binomial distribution are 4 and 4/3, then Solve P(X≥1). [2M]
e) Define Central Limit theorem. [2M]
f) Find the value of the finite population Correction factor for n=10, N=100. [2M]
g) The mean and standard deviation of a population are 11795 and 14054 respectively. If n=50, find 95% confidence interval for the mean. [2M]
h) Explain about t-distribution. [2M]
i) Define Stochastic Matrix. [2M]
j) If the transition probability matrix is $\begin{bmatrix} 0 & 0.2 & x \\ x & 0.1 & y \\ 0.1 & 0.2 & z \end{bmatrix}$. Find x, y and z. [2M]

PART-B **(50 Marks)**

2. Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each draw. Find the probability that (i) Both are white (ii) First is red and second is white. [10M]

OR

3. For the continuous probability function $f(x) = kx^2e^{-x}$ when $x \geq 0$, find (i) k (ii) mean and (iii) variance. [10M]

4. A hospital switch board receives an average of 4 emergency calls in a 10 minutes interval. What is the probability that i) there are at most 2 emergency calls in a 10 minute interval ii) there are exactly 3 emergency calls in a 10 minute interval. [10M]

OR

5.a) Define Binomial Distribution. [3M]
b) The probability that a man hitting a target is 1/3. If he fires 6 times, find the probability that he fires i) at most one time ii) Exactly once iii) atleast 2 times. [7M]

6. In a Normal distribution, 7% of the item are under 35 and 89% are under 63. Find the mean and standard deviation of the distribution. [10M]

OR

7. Samples of size 2 are taken from the population 3,6,9,15,27 with replacement. Find [10M]

i) The mean of the population.

ii) The standard deviation of the population.

iii) The mean of the sampling distribution of means.

iv) The standard deviation of the sampling distribution of means.

8. In a city P, 20% of random sample of 900 school boys has a certain slight physical defect. In another city Q, 18.5% of a random sample of 1600 school boys has same defect. Is the difference between the proportions significant at 0.05 level of significance? [10M]

OR

9. The mean life of a sample of 10 electric bulbs was found to be 1456 hours with SD of 423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with SD of 398 hours. Is there a significant difference between the means of two batches? [10M]

10. If the transition probability matrix market shares of three brands A,B and C is $\begin{bmatrix} 0.4 & 0.3 & 0.3 \\ 0.8 & 0.1 & 0.1 \\ 0.35 & 0.25 & 0.4 \end{bmatrix}$ and the initial market share are 50%, 25% and 25%. Find i)The market share in second and third periods ii) the limiting probabilities. [10M]

OR

11.a) Explain Markov chain with an example. [4M]

b) Three boys A,B,C are throwing a ball to each other. A always throws the ball to B and B always throws the ball to C but C is just as likely to throw the ball to B as to A. Show that the process is Markovian. [6M]

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