Code No.: (R22MA402BS) | R22 | 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
(CSE)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 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 **(10 Marks)**

1. a) Describe discrete and continuous random variables. [1M]
   b) Write Conditions of discrete probability distribution. [1M]
   c) The mean and variance of a binomial distribution are 2 and 8/5. Determine n value. [1M]
   d) Write the condition of binomial distribution. [1M]
   e) A sample of size 10 was taken from a population S.D of sample is 0.3. Find the maximum error with 99% confidence. [1M]
   f) State Central limit theorem. [1M]
   g) Discuss the Type –I error and Type –II error. [1M]
   h) Explain the procedure for testing of hypothesis. [1M]
   i) Define Markov chain. [1M]
   j) Explain periodic and aperiodic states. [1M]

PART-B **(50 Marks)**

2. The Probability density function of a variate x is [10M]

X	0	1	2	3	4	5	6
P(X)	K	3K	5K	7K	9K	11K	13K

(i) Find k value (ii) $p(X<4)$, $P(X \geq 5)$,
(ii) $P(3 < X < 6)$
(iii) What will be the minimum value of k so that $P(x < 2) > 0.3$

OR

3. A continuous random variable has the probability density function [10M]

$$f(x) = \begin{cases} k\,x\,e^{-\lambda x}, & for\ x \geq 0,\ \lambda > 0 \\ 0, & otherwise \end{cases}$$

Determine (i) K (ii) Mean (iii) Variance

4.a) Two dice are thrown five times. Find the probability of getting 7 as sum (i) at least once (ii) exactly two times (iii) $P(1 < X < 5)$. [5M]
   b) A coin is biased in a way that a head is twice as likely to occur as a tail. If the coin is tossed 3 times find the probability of getting 2 tails and 1 head. [5M]

OR

5. Derive the mean and variance of binomial distribution. [10M]

6. In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find [10M]
i) How many students score between 12 and 15.
ii) How many score above 18.
iii) How many score below 18.

OR

7.a) In a normal distribution 31% of the items are under 45 and 8%are over 64. Find the mean and variance of the distribution. [5M]

b) A sample of size 10 was taken from a population S.D. of sample is 0.03.Find the maximum error with 99 % confidence. [5M]

8.a) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population. [5M]

b) The mean and standard deviation of a population are 11795 and 14054 respectively. If n=50, Find 95 % confidence interval for the mean. [5M]

OR

9.a) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? [5M]

b) A die is tossed 960 times and it falls with 5 upwards 184 times. Is the die unbiased at a level of significance of 0.01. [5M]

10. The one step T.P.M. of Markov chain $\{x_n : n = 0,1,2,.....\}$ having state space $\{1,2,3\}$ is [10M]

$P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$ and initial distribution $P_0 = (0.7, 0.2, 0.1)$. Find

(i) $P(x_2 = 3 / x_0 = 1)$ (ii) $P(x_2 = 3)$ (iii) $P(x_3 = 2, x_2 = 3, x_1 = 3, x_0 = 1)$

OR

11. Check whether the following Markov chain is 'regular and ergodic'. [10M]

$$P = \begin{bmatrix} 1 & 1/2 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1/2 \\ 1/2 & 0 & 0 & 1/2 \\ 0 & 1/2 & 1/2 & 1/2 \end{bmatrix}$$

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