Code No.: MA402BS

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) -June- 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) In throwing two dice, find the probability of getting a sum 10. [2M]
b) Define random variable. [2M]
c) Define variance of the continuous random variable. [2M]
d) If the mean of Binomial distribution is 3 and variance is 9/4, obtain the value of *n*. [2M]
e) Write any two properties of Normal distribution. [2M]
f) Define Poisson distribution. [2M]
g) Write about Type – I and Type – II error. [2M]
h) Write the confidence interval for the population Proportion. [2M]
i) Define stochastic process. [2M]
j) Define Markov processes. [2M]

PART-B **(50 Marks)**

2. Three machines I, II and III produce 40%,30% and 30% of the total number of items of a factory. The percentages of defective items of these machines are 4%, 2% and 3%. An item is selected at random and found to be defective. Find the probability that it is from i) Machine- I ii) Machine-II iii) Machine-III. [10M]

OR

3. Suppose a continuous function X has the probability density function [10M]
$f(x) = \begin{cases} 2ke^{x}, x > 0 \\ 0, otherwise \end{cases}$ Compute (i) k, (ii) the distribution function for X and (iii) $P(1 < X \leq 2)$

4. Fit a Binomial distribution for the following data [10M]

x	0	1	2	3	4	5
f	2	14	20	34	22	8

OR

5.a) If X, Y are independent random variables, prove that E(XY)= E(X)E(Y). [5M]
b) If the variance of a Poisson variate is 3. Find the probability that: [5M]
i) P(x=0) ii) P(1≤x<4).

6. Ten individuals are chosen at random from a normal population and their heights are found to be 63, 63,66,67,68, 69, 70, 70, 71, 71 inches. Test if the sample belongs to the population whose mean height is 66 inches. [10M]

OR

7. Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results. Test whether two horses have the same running capacity. [10M]

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	-

8. In a city A 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions is significant at 0.05 level of significance. [10M]

OR

9. A sample of 900 members has a mean 3.4 cms and S.D 2.61 cms. Is this sample has been taken from a large population of mean 3.25 and S.D 2.61cms. If the population is normal and its mean is unknown find the 95% fiducial limits of true mean. [10M]

10. A training process is considered as a two state Markov chain. If it rains it is considered to be in state 0, and it doesn't rain the chain is in state 1. The transition probability of the Markov chain is defined by P= $\begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$. Find the probability that it will rain for three days from today assuming that it is raining today. Assume that the Mutual probabilities of state 0 or state 1as 0.4 and 0.6 respectively. [10M]

OR

11. Consider the Markov Chain on with transition matrix P= $\begin{bmatrix} 0.4 & 0.3 & 0.2 & 0.1 \\ 0.5 & 0 & 0 & 0.5 \\ 0.5 & 0 & 0 & 0.5 \\ 0.1 & 0.2 & 0.3 & 0.4 \end{bmatrix}$. Find the nature of states of the Markov chain. [10M]

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