

Code No.: MA302BS

R20

H.T.No.

8 R

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

II-B.TECH-I-Semester End Examinations (Regular) - February- 2023
COMPUTER ORIENTED STATISTICAL METHODS
(CSD)

[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) Explain Discrete random variable with suitable example. [2M]
b) Define i) conditional probability ii) independent events. [2M]
c) If $f(x) = \begin{cases} \frac{1}{2}(x+1) & -1 < x < 1 \\ 0 & \text{elsewhere} \end{cases}$ [2M]

Find $E(x)$

- d) If the mean of poisson distribution is 3 . Then find $p(x=0)$. [2M]
e) What is the probability density function for Exponential distribution? [2M]
f) State Central limit theorem. [2M]
g) Define critical region. [2M]
h) Write short notes on type I and type II errors. [2M]

- i) Consider the Markov chain with transition Probability matrix

$$\begin{bmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Is this matrix irreducible?

- j) What is a three- state Markov chain with the transition matrix. [2M]

PART-B

(50 Marks)

2. a) State and prove Baye's theorem. [5M]
b) The machines A, B, C produce 40%, 30%, 30% of the total number of items of factory. The percentage of defective items of these machines are 4%, 2%, 3%. If an item is selected at random and is found to be defective find the probabilities that it is produced from i) machine A ii) machine C. [5M]

OR

3. Define Probability Density function? The probability density function of a variable 'x' is [10M]

x	0	1	2	3	4	5
P(x)	k	3k	5k	7k	9k	11k

Find (i) 'k' (ii) $p(x < 4)$ (iii) $p(3 < x \leq 5)$

4. Derive the mean and variance of Poisson distribution. [10M]
OR
5. State and Prove Chebyshev's theorem. [10M]
6. A population consists of five numbers 2,3,6,8, and 11. Consider all possible samples of size two Which can be drawn with replacement from this population. Find i) The population mean. ii) The standard deviation of the population. iii) The mean of the sampling distribution of means. iv) Standard deviation of the sampling distribution of means. [10M]
OR
7. Find the mean and S.D of the normal distribution in which 7% of the items are under 35 and 89% are under 63. [10M]
8. Random samples of 400 men and 600 women were asked whether they would like to have a flyover near the residence, 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level. [10M]
OR
9. A simple sample of the heights of 6400 English men has a mean of 67.585 inches and a S.D of 2.56 inches while a simple sample of height of 1600 Australians has mean of 68.55 and a S.D of 2.52. Do the data indicate the Australians are on the average taller than Englishmen use 1% level of significance? [10M]
10. A fair die is tossed repeatedly. If X_n denotes the maximum of the numbers occurring in the first n tosses, find the transition probability matrix P of the Markov chain $\{X_n\}$. Find also P^2 and $P(X_2=6)$. [10M]
OR
- 11.a) Let $P=1/2$, $q=1/2$, $z=500$, $a=1000$, then find the expected duration of game [5M]
 b) Suppose that the probability of a dry (state 0) follows a rainy day (state 1) is $1/3$, and probability of a rainy day is $1/2$. Then we have a two state markov chain such that $P_{10}=1/3$ are $P_{01}=1/2$ then find the transition probability matrix. [5M]
