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

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Regular) - June- 2022
COMPUTER ORIENTED STATISTICAL METHODS
(Common to CSE, IT, CSM)

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

Note: 1. Answer *any FIVE questions. Each question carries 14 marks.*
2. All questions carry equal marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

5X14=70

1. a) State and Prove Addition theorem on probability? [7M]
b) A random variable X has the following probability function: [7M]

x	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find the value of k and Evaluate
$P(X < 6)$, $P(X \geq 6)$, $P(0 < X < 5)$.

2. a) The joint probability function(x,y)is given by $p(x,y)=k(2x+3y)$ where x=0,1,2 and y=1,2,3 [7M]
i. Find the Marginal distribution
ii. Find the Conditional distribution of x/y

b) Fit a binomial frequency distribution for the following data [7M]

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

3. a) In a normal distribution exactly 7%of the items are under35 and 89% are under 63. What are the mean and S.D of the distribution? [7M]
b) A population consists of five numbers 3, 6, 9, 15 and 27. Consider all possible samples of size 3 that can be drawn without replacement from this population. Find [7M]
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.

4. a) A sample of 400 items is taken from a population whose S.D is 10, mean of the sample is 40. Test whether the sample has come from a population with a mean 38 also calculate 95% (z_α = 1.96) confidence interval for the population. [7M]
b) The following table gives the classification of 100 workers according to the sex and nature of th work. Test whether the nature of work is independent of the sex of the worker. [7M]

	stable	unstable	Total
Males	40	20	60
Females	10	30	40
Total	50	50	100

5. a) Two boys B_1, B_2 and two girls G_1, G_2 are throwing a ball from one to other. Each boy throws the ball to other boy with probability ½ and to each girl with probability 1/4. On the other hand each girl throws the ball to each boy with probability ½ and never to other girl. In the long run how often does each received the ball? [7M]

b) Suppose an urn A contains 2 white marbles and urn B contains 4 red marbles. At each step of the process, marble is selected at random from each urn and the two marbles selected are interchanged. Let Xn denote the number of red marbles in urn A after n interchanges. [7M]

i. Find the transition matrix P.

ii. What is the probability that there are 2 red marbles in urn A after 3 steps.

6. a) State and prove Baye's theorem. [7M]

b) For the continuous probability function. [7M]

$f(x)=kx^2e^{-x}$ when $x\geq 0$, find

i. k

ii. mean

iii. Variance.

7. a) Let X and Y be two random variables each taking values -1, 0 and 1. And it has following joint probability distribution. [7M]

x/y	-1	0	1
-1	0	0.2	0
0	0.1	0.2	0.1
1	0.1	0.2	0.1

Show that

i. X and Y have different expectation.

ii. Find Covariance X, Y

iii. Find Var(X) & Var(Y).

b) If X is a Poisson variate such that [7M]

$P(X=1)3/2= P(X=3)$. Find $P(X\geq 1)$ and $P(2\leq X\leq 5)$.

8. a) In a uniform distribution for the interval (a,9) and $P(3<X<5)=2/7$. Find a and $P(|X-5|<2)$. [7M]

b) If two independent random samples of size $n_1=13$ and $n_2=7$are taken from a normal population. What is the probability that the variance of the first sample will be at least four times as that of the second sample. [7M]

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