Reg No.:_____ Name:_____

0520MCA162052302

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (Two Years) Degree (R,S) Examination May 2024

Course Code: 20MCA162

Course Name: APPLIED STATISTICS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. ***Marks***

1 A random variable has the following pdf (3)

X	-2	-1	0	1	2	3
$f(x)$	$\frac{1}{10}$	k	$\frac{1}{5}$	$2k$	$\frac{3}{10}$	$3k$

Compute k and mean.

2 If X follows Poisson distribution with mean 6, find $P(X = 1)$, Variance (X) (3)

3 Derive the mean and variance of exponential distribution. (3)

4 A random variable X has uniform distribution in (-4,4) find $P(|X| \leq 2)$. (3)

5 If the two regression lines are $4x - 5y + 33 = 0\ and\ 20x - 9y = 10$, find the correlation coefficient between $x\ and\ y$ (3)

6 Show that correlation coefficient γ lies between $-1 \leq \gamma \leq 1$. (3)

7 Define standard error. (3)

8 Explain the properties of a good estimator. (3)

9 A die was thrown 9000 times and of these 3220 times yielded a 3 or 4. Can the die be regarded as unbiased? (3)

10 Define Type I and Type II error. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11 A discrete random variable X has mean 6 and variance 2. If it is assumed that the distribution is binomial find (i) $P[5 \leq X \leq 7]$ (ii) $P[X \leq 2]$ $(iii) P[X > 7]$. (6)

OR

12 Prove that Binomial distribution with parameter ***n*** and ***p*** can be approximated to Poisson distribution when ***n*** is large and ***p*** is small. (6)

Module II

13 In an examination, 30% of the students got marks below 40 and 10% got marks above 75. Assuming the marks are normally distributed find the mean and standard deviation of the distribution. (6)

OR

14 The time in hours required to repair a machine is exponentially distributed with mean 120. What is the probability that the repairing time is (i) at most 1 day (ii)at least 180 hours. (6)

Module III

15 The pdf of a bivariate distribution given by (6)

$P(X = x, Y = y) = \frac{x^2+y}{32}$, $for \quad x = 0,1,2,3 \; and \quad y = 0,$ Find the marginal distribution $of \;\; X \;\; and \;\; Y \; and \; conditional \; distribution \; of \;\; X \;\; given \;\; Y = 1$

OR

16 Fit a parabola of the form $y = a + bx + cx^2$ by the principle of least squares for the following data (6)

x	1	2	3	4	5
y	2	6	7	8	10

Module IV

17 Suppose the following 6 values represent random observations from a normal population. 63,65,58,69,71 and 72. Construct a 95% confidence interval for the mean of the population. (6)

OR

18 Explain the different types of sampling. (6)

Module V

19 A shopkeeper claims that almost 60% of customers entering the shop leaves without making a purchase. Out of a random sample of 50 customers, 35 found to leave without making a purchase. Does the data support the claim of the shopkeeper at 1% level of significance (6)

OR

20 From the given data test at 5% level of significance whether there is any significance difference between means of A and B (6)

Sample	Sample size	Mean	SD
A	80	100	12
B	700	95	10

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