Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Year) Degree Regular and Supplementary Examination June 2023

Course Code: 20MCA162
Course Name: APPLIED STATISTICS

Max. Marks: 60   Duration: 3 Hours

PART A
Answer all questions, each carries 3 marks.

Marks

1   Write the pdf of the binomial distribution for which mean is 4 and variance is 3.   (3)

2   The probability distribution function of a random variable is given below.   (3)

Find $E(Y)$ where $Y = X^2 + X$

X	0	1	2	3
$f(x)$	0.1	0.3	0.4	0.2

3   Is the function $f(x) = \begin{cases} \frac{1}{18}(3 + 2x), & 2 \leq x \leq 4 \\ 0 & otherwise \end{cases}$ a pdf . Find $P[2 \leq X \leq 3]$.   (3)

4   A point is chosen at random from the line segment [0,4]. What is the probability that chosen   (3)
    point X lies   (i) between 1 and 2   (ii) $X \geq 2$.

5   State the principle of least squares.   (3)

6   Find the value of k if the joint probability function (X, Y) is given by   (3)

$$P(x, y) = k(2x + 3y), \quad where \ x = 0,1,2 \ \ and \ y = 1,2,3$$

7   What do you mean by population and sample?   (3)

8   What are the properties of a good estimator?   (3)

9   A coin is tossed 10,000 times and head turns up 5195 times. Is the coin unbiased?   (3)

10 Define null hypothesis and alternate hypothesis.   (3)

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

Module I

11 Derive mean and variance of Poisson distribution   (6)

OR

12 The pdf of a random variable X is given below.   (6)

Find $(i) k$ $(ii) P[X < 4]$ $(iii) E(X)$ $(iv) V(X)$

X	0	1	2	3	4	5	6
$f(x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

Module II

13 If X is normally distributed with mean 1 and variance 4 then   (6)

(i) find $P[-3 < X < 3]$ (ii) obtain k if $P[X \leq k] = 0.6$

OR

14 The time in hours required to repair a machine is exponentially distributed with mean 2.   (6)
What is the probability that the repairing time is   (i) at most 1 hour   (ii)at least 30 minutes

Module III

15 If θ is the angle between regression lines , Show that $tan\theta = \pm \frac{1-\gamma^2}{\gamma} \frac{\sigma_x \sigma_y}{\sigma^2_x + \sigma^2_y}$ (6)

OR

16 Fit a straight line by the principle of least squares for the following data   (6)

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

Module IV

17 A sample of 100 items gave a mean 7.4kg and a S.D 1.2 kg. Find a 95% confidence interval   (6)
for the population mean.

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   (6)
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 5% level of significance.

OR

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

Sample	Sample size	Mean	SD
A	645	7.90	0.47
B	450	7.88	0.42

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