Code No: E-5065/O/AICTE

FACULTY OF ENGINEERING

B.E. (EEE/EIE/CSE) IV-Semester (AICTE) (Backlog) (Old) Examination, February / March-2023

Subject: Mathematics-III

Time: 3 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all the questions. **(10 x 2 = 20 Marks)**

1. Let A and B two events such that $P(A) = 0.6, P(B) = 0.4$ and $P(A \cap B) = 0.25$. Find $P(B/A)$.
2. Can the function $f(x) = \begin{cases} |x| & ,-1 \le x \le 1 \\ 0 & elsewhere \end{cases}$ be the p.d.f of a continuous random variable?
3. Find the mean of the Poisson distribution.
4. Define Skewness of a distribution .
5. Find the moment generating function of the uniform distribution.
6. Define exponential distribution.
7. Write the normal equations to fit a straight line of the form $y = a + bx$.
8. Define correlation and regression.
9. Find the students test statistic t for the following variable values in a sample of eight. $-4, -2, -2, 0, 2, 2, 3, 3$ taking the mean of the universe to be zero.
10. Briefly explain Chi-square test for independence of attributes.

PART – B

Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11. (a) State and prove Baye's theorem.
    (b) A random variable X has the following probability function:

X	1	2	3	4	5
$P(X)$	K	K	$3K$	$K^2 + K$	$6K^2$

Find (i) K (ii) $E(X)$ and (iii) $P(1 < X < 4)$.

12. (a) Fit a binomial distribution to the following data.

x	0	1	2	3	4	5
f	10	20	30	15	15	10

    (b) Find the first three moments about the mean for the series 4,5,6,1,4.

13. In a distribution which is exactly normal, 12% of the items are under 30 and 85% are under 60. Find the mean and standard deviation of the distribution.

14. (a) Find the rank correlation coefficient for the following data.

x	1	2	3	4	5
y	5	3	4	1	2

    (b) The sizes and means of two independent random samples are 400,225; 3.5 and 3.0 respectively. Can we conclude that the samples are drawn from the same population with standard deviation 1.5?

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15. The values in two random samples are given below.

Sample I	15	25	16	20	22	24	21	17	19	23	-	-
Sample II	35	31	25	38	26	29	32	34	33	27	29	31

Can we conclude that the two samples are drawn from the same population? Test at 5% level of significance.

16. Find the mean, variance and moment generating function of the binomial distribution.

17. (a) A continuous random variable X has p.d.f $f(x) = \frac{3}{4}(x^2 + 1), 0 \leq x \leq 1$. Find '$a$' such that $P(X \leq a) = P(X > a)$.

(b) Fit a curve of the form $y = ax^2 + bx + c$ to the following data.

x	0	1	2	3	4
y	0	1.8	1.3	2.5	6.3

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