Code No: F-13703/N/BL/AICTE

FACULTY OF ENGINEERING

B.E. (CSE) IV - Semester (AICTE) (Main & Backlog) (New) Examination,
August / September 2024

Subject: Mathematics – III

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

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) From 20 tickets, marked with the first 20 numerals, one is drawn at random. Find the chance that it is multiple of 3 or 7.
   b) Define Conditional Probability and give an example
   c) The m.g.f of a random variable X is $\left(\frac{2}{3}+\frac{1}{3}e^{t}\right)^{9}$, find the Binomial distribution.
   d) If a Poisson distribution is such that $\frac{3}{2}P(X=1)=P(X=3)$, then find the mean of a distribution.
   e) Find the m. g. f of exponential distribution.
   f) The coefficient of regression of x on y is 3.2 and coefficient of regression of y on x is 0.8 then find the required coefficient correlation and comment it.
   g) Express the properties of Chi – Square(χ^2) distribution.

2. a) $'A'$ can hit a target once in five shots. $'B'$ can hit two targets in three shorts. $'C'$ can hit one target in four shots. What is the probability that two shots hit the target.
   b) If a random variable has the probability density $f(x)$ as $f(x)=\begin{cases}2e^{-2x}, x>0\\ 0, \ x\le 0\end{cases}$ find the probabilities that it will take on a value (i) between 1and 3 (ii) greater than 0.5

3. a) A discrete random variable X has the mean 6 and variance 2. If it is assumed that the distribution is Binomial find the probability that $5\le x\le 7$.
   b) A car hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days (i) on which there is no demand (ii) on which demand is refused.

4. a) In an sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find (i) how many students score between 12 and 15 (ii) how many score above 18.
   b) A manufacturer knows from experience that the resistance of resistors he produces is normal with mean 100 ohms and standard deviation 2 ohms. What percentage of resistors will have resistance between 98 ohms and 102 ohms.

5. a) Fit a second-degree parabola to the following data using method of least squares.

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

   b) The proportions of literates between groups of people of two districts A and B are to be tested. If the 100 persons from each of the districts selected at random, 32 of district A and 40 of district B are literates. Test whether the observed proportion of literates is statistically significant.

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a) A sample of 26 bulbs give a mean life of 990 hours with a S. D. of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not upto the standard.

b) The number of automobile accidents per week in a certain community are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period.

a) In a group consisting of equal number men and women 10% of the men and 45% of the women are unemployed. If a person is selected randomly from the group, then find the probability that the person is an employee.

b) The probability that John hits a target is $\frac{1}{2}$. He fires 6 times. Find the probability that he hits the target (i) exactly 2 times (ii) more than 4 times (iii) at least once.

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