

Code No. G-5068/H/BL/AICTE

FACULTY OF ENGINEERING

B.E. (IoT/IT) III-Semester (AICTE) (NEW) (Backlog) Examination, July/August 2025

Subject: Engineering Mathematics -III (P&S)/ Mathematics - III (P & S)

Max. Marks: 70

Time: 3 Hours

- Note: i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
ii) Answers 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 suitably be assumed.

1. a) State Baye's Theorem.
b) If a Poisson distribution is such that $\frac{1}{2} P(X = 1) = P(X = 3)$, then find the mean of a distribution.
c) Define Exponential distribution.
d) Regression coefficient of y on x is 0.7 and that of x on y is 3.2, then find the correlation coefficient.
e) State any two applications of Chi-square test.
f) Define Random variable.
g) Fit a straight line $y=a+bx$ to the following data.

x	3	5
y	15	31

2. a) Three machines A, B and C produce identical items. Of their respective output 5%, 4% and 3% of items are faulty. On a certain day, machine A has produced 25% of the total output, machine B has produced 30% and machine C the remainder. An item selected at random is found to be faulty. What are the chances that it was produced by the machine with the highest output?
b) If $f(x) = \begin{cases} \frac{1}{2}(x+1), & -1 < x < 1 \\ 0, & \text{elsewhere} \end{cases}$ represents the density of a random variable X, find $E(X)$ and $E(X^2)$.
3. a) If the chance that one of the 10 telephone lines is busy at an instant is 0.2. What is the probability that 5 of the lines are busy?
b) A certain screw making machine produces on average of 2 defective screws out of 100, and packs them in boxes of 500. Find the probability that a box contains 15 defective screws.
4. a) Find the mean and variance of an Exponential distribution.
b) If X is a normal variate with mean 30 and Standard Deviation 5, find the probability that $(26 \leq X \leq 40)$. (Given $p(0.8)=0.2881$, $p(2)=0.4772$).

5. a) Find the curve of best fit of the type $y = ae^{bx}$ to the following data

x	1	5	7	9	12
y	10	15	12	15	21

- b) Ten participants in a contest are ranked by two judges as follows: Calculate the correlation coefficient.

x	1	6	5	10	3	2	4	9	7	8
y	6	4	9	8	1	2	3	10	5	7

6. A dice is thrown 102 times and the following distribution is obtained:

x	1	2	3	4	5	6	Σ
f	15	25	16	20	12	14	102

Can we conclude that all faces are equally likely to occur? Test at 5% level of significance. (Given $\chi^2_5(0.05) = 11.07$) and Write any two properties of F-distribution.

7. a) Fit a Poisson distribution to the set of observations:

x	0	1	2	3	4
f	122	60	15	2	1

- b) A bag contains 8 white and 6 red balls. Find the probability of drawing two balls of the same colour.