



K25U 3078

Reg. No. :

Name :

**III Semester B.Sc. Degree (CBCSS – OBE – Supplementary/Improvement)
Examination, November 2025
(2023 Admission)**

**Complementary Elective Course in Statistics for B.Sc. Artificial
Intelligence and Machine Learning
3C03STA – AIMI : PROBABILITY AND DISTRIBUTION THEORY**

Time : 3 Hours

Max. Marks : 40

Instruction : Use of calculators and Statistical tables are permitted.

**PART – A
(Short Answer)**

Answer **all 6** questions.

(6×1=6)

1. Explain event.
2. State Baye's rule.
3. Define independent events.
4. Define random variable.
5. Under what conditions Binomial distribution tends to Poisson distribution ?
6. Write the probability density function of Normal distribution.

**PART – B
(Short Essay)**

Answer **any 6** questions.

(6×2=12)

7. Define sample space. Also write the sample space of the experiment tossing a coin two times.
8. Define random experiment with an example.
9. Using axiomatic approach prove that $P(A^c) = 1 - P(A)$.

P.T.O.



10. Let $P(X) = \frac{x}{15}$, $x = 1, 2, 3, 4, 5$ be the probability density function of a random variable X . Find (1) $P(X = 1 \text{ or } X = 2)$ (2) $P(X > 1)$.
11. Define probability density function and state its properties.
12. Write a short note on expectation of a random variable.
13. Write any four properties of normal distribution.
14. Define statistic and standard error.

PART – C
(Essay)

Answer **any 4** questions.

(4×3=12)

15. State classical definition of probability. What are the limitations of classical definition ?
16. Define conditional probability. State and prove multiplication theorem of probability.
17. Explain the two types of random variable.
18. State and prove any three properties of expectation.
19. Define Binomial distribution with parameter n and p . Also find its mean.
20. Derive the sampling distribution of sample mean.

PART – D
(Long Essay)

Answer **any 2** questions.

(2×5=10)

21. a) State and prove addition theorem for two events.
b) State and prove addition theorem for three events.
22. If A and B are two independent events then prove that (a) A and B^c are independent (b) A^c and B are independent (c) A^c and B^c are independent.
23. Find mean and variance of Poisson distribution.
24. Define chi-square, Student's t and F distribution. Also explain the interrelationship between them.
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