K26FY0362 Pages: 2 Reg No:................

Name:................

Fourth Semester FYUGP Degree (Reg) Examination April 2026

KU4DSCSTA204 - STANDARD PROBABILITY DISTRIBUTIONS

2024 Admission onwards

Time : 1.5 hours Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. If $X \sim B(n_1, p)$ and $Y \sim B(n_2, p)$, show that $X + Y \sim B(n_1 + n_2, p)$.
2. The mean of Binomial distribution is 4 and variance is 3. Find p.
3. Write the pdf of bivariate normal distribution.
4. Comment on the statement, "if marginal PDF's of X and Y are normal then joint pdf of (X, Y) is bivariate normal."
5. If X is normally distributed with zero mean and variance σ^2, define the density function of $U = e^X$.
6. Define how cauchy distribution is related to normal distribution.
7. A random variable X has a uniform distribution over $(-3, 3)$. Obtain the mean of the distribution.
8. State the m.g.f of gamma distribution.

Section B

Answer any 4 questions. Each carry 6 marks.

9. X is normally distributed and the mean of X is 12 and S.D is 4. Find the probability of: (i) $X \geq 20$ (ii) $X \leq 20$ (iii)$0 \leq X \leq 12$.
10. For a certain normal distribution, the first moment about 10 is 40 and the fourth moment about 50 is 48.Find the arithmetic mean and standard deviation of the distribution.
11. Let X have a standard cauchy distribution.Obtain the p.d.f for X^2 and identify its distribution.
12. Show that Gamma$(1, \lambda)$ reduces to exponential distribution.
13. State and prove the additive property of gamma distribution.

14. Derive the r-th raw moment of Beta distribution of second kind.

Section C

Answer any 1 questions. Each carry 14 marks.

15. Obtain the moments of Binomial distribution.
16. (a) If (X, Y) follows bivariate normal distribution find conditional distributions of X given Y and Y given X

    (b) Show that a random vector (X, Y) follows bivariate normal distribution if and only if every linear combination of X and Y is a normal variate.