

Branch – MATHEMATICS WITH COMPUTER APPLICATIONS

CORE ELECTIVE – II MATHEMATICAL STATISTICS

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 x 2 = 20)

- 1 Define equally likely events.
- 2 State probability function.
- 3 Define discrete random variable.
- 4 Define probability mass function.
- 5 Define multiplication theorem of expectation.
- 6 State Cauchy-Schwartz inequality.
- 7 Define Bernoulli distribution.
- 8 Write down the probability generating function of Poisson distribution.
- 9 Define additive property of χ^2 - variates.
- 10 Define student's 't' - test.

SECTION - B (25 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a Show that probability of the complementary event \bar{A} of A is given by $P(\bar{A}) = 1 - P(A)$.
OR
b If A and B are independent events, verify that \bar{A} and \bar{B} are also independent events.
- 12 a A probability curve $y = f(x)$ has a range from 0 to ∞ . If $f(x) = e^{-x}$, find the mean variance and the third moment.
OR
b Define any five properties of joint distribution function.
- 13 a State and prove addition theorem of expectation.
OR
b Prove that $|E(x)| < E|x|$.
- 14 a Explain physical conditions for binomial distribution.
OR
b State and prove additive or reproductive property of independent Poisson variates.
- 15 a Find the moment generating function of χ^2 distribution.
OR
b Derivation of student's t-distribution.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

- 16 State and prove Boole's inequality.
- 17 A probability curve $y = f(x)$ has a range from 0 to α . If $f(x) = e^{-\lambda} \lambda^x / x!$, $x = 0, 1, 2, \dots$ find the mean variance and the third moment about mean.
- 18 State and prove Cauchy – Schwartz inequality.
- 19 Find mode of the binomial distribution.
- 20 State and prove Fisher's lemma.