

B.Sc. Sem.-5 Examination

CC-301

Statistics

March-2025

Time : 2-30 Hours]

[Max. Marks : 70

Instructions: 1. Figures to the right indicate full marks of respective questions.

2. Use of a Scientific Calculator is allowed.

Q.1 (A) Define geometric distribution. Obtain its cumulant generating function. Hence find mean and variance of geometric distribution (07)

(B) Find out the standard error of sample raw moment. (07)

OR

(A) Obtain the expression for standard error of sample mean. (07)

(B) Show that the sample raw moment is an unbiased estimator of the corresponding population raw moment. State the formula for variance of μ'_r and standard error of μ'_r . (07)

Q.2 (A) Show that if T_1 and T_2 are independent unbiased estimator of θ then exists infinitely many unbiased estimators. (07)

(B) State and prove Rao-Cramer Inequality for the variance of an unbiased estimator. (07)

OR

(A) Explain the standard error of sampling correlation coefficient. (07)

(B) Let X_1, X_2, \dots, X_n be a random sample of size n from $U(\theta, \theta + 1)$ distribution. Show that the sample mean is both unbiased and consistent estimator of $\theta + 1/2$. (07)

Q.3 (A) Explain the method of maximum likelihood for estimation of the unknown parameter. (07)

(B) Let X_1, X_2, \dots, X_n be a random sample of size n from distribution with pdf $f(x) = e^{-(x-\theta)}, x > \theta$. Obtain maximum likelihood estimator of the parameter θ . (07)

OR

(A) Let X_1, X_2, \dots, X_n be a random sample of size n from $U(a, b)$ distribution. Obtain moment estimator of a & b . (07)

(B) State and prove fisher Neyman theorem on sufficiency. (07)

Q.4 (A) Obtain $100(1-\alpha)$ % confidence interval for the variance of normal distribution when its mean is unknown. (07)

(B) Obtain $100(1-\alpha)$ % confidence interval for the variance of normal distribution when its mean is known. (07)

(P.T.O)

OR

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- (A) Explain the problem of interval estimation in detail. (07)
- (B) Obtain $100(1-\alpha)$ % confidence interval for the population proportion in binomial distribution. (07)
- Q.5 Attempt any **Seven**. (14)
1. Give Full form of BLUE.
 2. Explain the uses of method of moments.
 3. What is interval estimator?
 4. Define statistics.
 5. Define confidence coefficient.
 6. What do you mean by sufficiency?
 7. Let $f(x) = e^{-x}$, $x > 0$. Find the expected value of the length of the interval $(X, 1/2X)$.
 8. Criteria of good estimator.
 9. State the memoryless property of geometric distribution.
 10. Define: Cramer Rao inequality.
