LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FIFTH SEMESTER – **APRIL 2013**

ST 5504/ST 5500 - ESTIMATION THEORY

Date: 08/05/2013 Dept. No. Max. : 100 Marks
Time: 9:00 - 12:00

PART – A

ANSWER ALL THE QUESTIONS: (10 x 2 = 20)

1. Define Estimator.

2. What is meant by unbiasedness of estimators?

3. Define sufficiency.

4. What is the use of Rao – Blackwell Theorem?

5. State any four methods of estimation.

6. Define raw moment of a population.

7. Define BLUE.

8. Define Prior Distribution Give an example.

9. State the Gauss – Markov Model.

10. Define Consistency.

PART - B

ANSWER ANY FIVE QUESTIONS: (5 x 8 = 40)

11. If T_n is a consistent estimator of $\gamma(\theta)$ and $\psi\ \{\gamma(\theta)\}$ is a continuous function of $\gamma(\theta)$, then show that $\psi\ (T_n)$ is a consistent estimator of $\psi\ \{\gamma(\theta)\}$.

12. Obtain the MVB estimator for μ in normal population $N(\mu,\sigma^2)$, where σ^2 is known.

13. Explain the Minimum Chi-square method.

14. Explain about the Bayes' estimator.

15. State and prove the necessary and sufficient condition for a parametric function to be linearly estimable.

16. Explain the method of moments.

17. State and prove Factorization Theorem.

18. Discuss UMVU estimation.

PART-C

ANSWER ANY TWO QUESTIONS: (2 x 20 = 40)

19. a. State and prove Cramer – Rao Inequality.

b. Let x_1, x_2, …… x_n be a random sample from a normal population. N(μ,1). Show that $T = (1/n) \sum_{i=1}^{n} x_i^2$ is an unbiased estimator of μ^2+1

20. a. State and prove Rao – Blackwell theorem.

b. Suppose T_1 is an unbiased minimum variance estimate and T_2 is any other estimate with variance σ^2/e. Then prove that the correlation between T_1 and T_2 is $\sqrt{e}$.

21. a. Let x_1, x_2, …, x_n be a random sample from N(μ,σ^2) population. Find sufficient estimators for μ and σ^2.

b. Establish Chapman – Robbins Inequality and mention its importance.

22. a. Explain in detail the Method of Maximum Likelihood Estimation and state its properties.

b. Find the MLE for the parameter λ of a Poisson distribution on the basis of a sample of size 'n'. Also find its variance.

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