15152

M.Sc DEGREE EXAMINATION DECEMBER 2015
I SEMESTER
Statistics
PAPER II: ESTIMATION THEORY

Time : 3hours (No additional sheet will be supplied) **Max Marks : 75**

PART- A (5x3=15 marks)
Answer any FIVE questions.
Each question carries THREE (3) marks.
Each answer should not exceed ONE (1) page.

1. Show that unbiasedness does not imply consistency.
2. Explain the concept of point estimation.
3. Explain the concept of sufficiency.
4. Explain pitman families.
5. State Cramer Huzurbazar theorem.
6. Explain connection between MLES and efficient estimators.
7. Explain the confidence intervals using pivots.
8. Explain interval estimation.

PART -B (4x15=60 marks)
Answer all questions.
Each question carries FIFTEEN (15) marks.
Each answer should not exceed SIX (6) pages

9. (a) State and Prove Cramer Rao inequality.
   (b) If X has the binomial distribution b(n, p) ,$0<p<1$ and n is known. Obtain an unbiased estimator of p^2.

(OR)

10. (a) State and prove Chapman-Robins in equality.
    (b) What is the point estimation? When do you say that the estimate of a parameter is good?
11. (a) State and prove Fisher-Neyman factorization theorem.
    (b) Define sufficiency. Obtain the sufficient statistics for the parameter of the Poisson distribution. Show that it is a complete statistic.

(OR)

12. (a) State and prove Lehmann-Scheffe theorem.
    (b) Let $x_1, x_2, \ldots\ldots, x_n$ be a random sample from $N(\mu,\sigma^2)$ Where μ and σ^2 are both unknown. Obtain sufficient statistics for $\theta=(\mu, \sigma^2)$.

13. (a) Define a CAN estimator. Explain the concept of CAN.
    (b) Explain maximum Likelihood method of estimation. State the assumptions.

(OR)

14. (a) Describe the maximum likelihood method of estimation. Find an ML estimator for the parameter θ in $f(x,\theta)= (1-\theta)x^{\theta}$,$0<x,< 1$, $\theta>0$ based on sample of size n.
    (b) Prove that ML estimator is asymptotically efficient.
15. (a) Distinguish between Censored and truncated distribution.
    (b) Explain type-I censoring for normal distribution.

(OR)

16. (a) Describe MLE in Censored truncated distribution.
    (b)Obtain shortest expected length confidence interval for the parameter θ based on a random sample from $U(.,\theta)$, $\theta>0$.
