B.Sc. DEGREE EXAMINATION,APRIL 2020
II Year IV Semester
Mathematical Statistics - II

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. State the variance of t distribution.
2. Define chi-square distribution.
3. Define unbiased estimator.
4. Define most efficient estimator.
5. State Neyman Factorisation theorem.
6. What is interval estimation?
7. Define sampling Distributions.
8. What is level of significance?
9. State the applications of t distribution.
10. What are the requirements for chi-square test for goodness of fit?
11. Define type II error.
12. Write the standard error of mean.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Derive the mean of Student's t distribution.
14. Derive the relationship between F and chi-square distribution.
15. State and prove Rao-Blackwell Theorem.
16. Find the MLE for the mean of normal distribution if standard.deviation is known
17. Explain the paired t-test.
18. Let X1, X2 and X3 is a random sample of size 3 from a population with mean μ and ariance σ^2, T_1, T_2, T_3 are the estimators used to estimate mean value μ where

    T_1= X1 + X2 – X3 , T_2 = 2X1 +3X2-4X3

    T_3= (λX1 + X2 + X3) /3

    (i) Are T_1, and T_2 unbiased estimators.

(ii) Find the value of λ such that T_3 is unbiased estimator for μ.

(iii) With the value of λ Check whether T_3 is consistent estimator.

(iv) Which is the best estimator?

19. The random variable X follows uniform distribution $(0, \theta)$ Find the sufficient estimator for θ.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Derive the probability density function of chi-square distribution and find the mean of the distribution.
21. State and prove Cramer-Rao inequality.
22. Derive the confidence Interval for ratio of variances of two normal population.
23. Explain the test for proportions of two populations.
24. Describe the exact test based on t distribution for means of two population.

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