K19U 0730

Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CCSS – Sup.) Examination, April 2019
(2013 and Earlier Admissions)
COMPLEMENTARY COURSE IN STATISTICS FOR MATHS/
COMPUTER SCIENCE CORE
4C04 STA : Statistical Inference

Time : 3 Hours

Max. Weightage : 30

PART – A

Answer **any 10** Questions. **(Weight : 10×1=10)**

1. Define Standard Error.

2. Define Chi Square variable.

3. Define Students t distribution.

4. Define Consistency of estimates.

5. Define bias of an estimate.

6. Define Most Efficient estimate.

7. State properties of MLE.

8. Define Simple and Composite Hypothesis.

9. Define Size and Power of a test.

10. State statistical basis of large sample tests.

11. A coin is tossed 1000 times and head turned up 518 times. Test whether the coin is unbiased.

PART – B

Answer **any 6** Questions. **(Weight : 6×2=12)**

12. Define Sufficiency of estimates. State Factorization theorem.

13. Derive all Raw and Central moments of t distribution.

14. Show that, if t has $t_{(n)}$ distribution, then t^2 has $F_{(1,n)}$ distribution.

15. Explain method of moments. Obtain the moment estimator of θ, if X has the distribution $f(x) = \{\theta\, x^{\theta+1}; 0 < x < 1, \theta > 0$

$\qquad\qquad\qquad\qquad$ {0 elsewhere.

16. Define MVB estimator. Show that the sample mean is MVB estimator of Poisson population.

17. Derive $(1- \alpha)$ 100% Confidence Interval for population variance of a Normal Population.

18. State N – P Lemma. A single observation is taken from

$\qquad f(x) = \{\theta\, e^{-\theta x} ; x > 0, \theta > 0$

$\qquad\quad$ { 0 otherwise.

Find size and power of the test.

19. Explain Chi Square test for Independence of Attributes.

20. Random samples were taken from two independent populations and the following results were obtained.

Sample	Size.	Mean	Standard deviation
1	80	29.8	2.1
2	100	30.6	1.9

i) Test whether population means differ significantly ?

ii) Obtain 95% confidence limits of difference of population means.

PART – C

Answer **any 2** Questions. **(Weight : 2x4=8)**

21. Derive sampling distribution of sample variance. Show that sample variance is consistent and biased estimator of population variance.

22. Explain method of Maximum Likelihood Estimation. Derive MLE of μ and σ^2 of Normal population.

23. Mileage of two brands of tyres ('000 kms) tested under standard conditions were as given below :

    Brand A : 37, 43, 40, 38, 39, 41

    Brand B : 41, 40, 38, 42, 37, 39

    Test whether :

    i) Both tyres have the same expected mileage.

    ii) Brand B is more consistent than brand A.

24. Explain Chi Square test for Goodness of fit. The following data gives number of road accidents occurred in a district over 500 days.

No. of Accidents (X) :	0	1	2	3	4	5	6
Frequency :	76	142	135	86	41	16	4

    Fit a Poisson distribution and test Goodness of fit.

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