K25U 0852

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/ Improvement) Examination, April 2025
(2019 to 2023 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN STATISTICS FOR B.SC. GEOGRAPHY/PSYCHOLOGY
4C04STA(G & P) : Inferential Statistics

Time : 3 Hours Max. Marks : 40

*Instruction : Use of **calculators** and **statistical** tables are permitted.*

PART – A
(Short Answer)

Answer **all 6** questions : (6×1=6)

1. Define parameter and statistic.
2. What is the difference between a null hypothesis and an alternative hypothesis ?
3. Explain the concept of point estimation.
4. Write an example of a statistic which is not unbiased but consistent.
5. Name two types of errors in hypothesis testing.
6. State the assumptions of ANOVA.

PART – B
(Short Essay)

Answer **any 6** questions : (6×2=12)

7. Define sufficiency of an estimator. Write an example for a sufficient statistic.
8. Differentiate between simple and composite hypotheses.
9. What are the properties of a good estimator ?

P.T.O.

10. Define most powerful test.

11. State merits of non-parametric tests.

12. What are the conditions for using chi square for testing agreement between theoretical frequencies and observed frequencies ?

13. Distinguish between significance level and power of the test.

14. Describe the Mann-Whitney U test.

PART – C
(Essay)

Answer **any 4** questions : (4×3=12)

15. Explain the method of interval estimation.

16. Let $X_1, X_2, X_3 \ldots X_n$ is a random sample drawn from $N(\mu, 1)$. Show that $t = \frac{1}{n}\sum_{i=1}^{n} X_i^2$ is an unbiased estimator of $\mu^2 + 1$.

17. The following data was obtained in an investigation about the effect of vaccination for smallpox.

	Vaccinated	Not Vaccinated	Total
Attacked by smallpox	3	12	15
Not Attacked	8	5	13
Total	11	17	28

Examine whether vaccination is effective in preventing smallpox.

18. State the assumptions of F-test.

19. Describe the steps involved in performing a chi-square test for independence.

20. Explain the steps involved in hypothesis testing.

PART – D
(Long Essay)

Answer **any 2** questions : **(2×5=10)**

21. The random samples were drawn from two normal populations and the following results were obtained :

    Sample I : 16, 17, 18, 19, 20, 21, 22, 24, 26, 27

    Sample II : 19, 22, 23, 25, 26, 28, 29, 30, 31, 32, 35, 36

    Test whether the two populations have the same mean or not.

22. Let X_1, X_2 and X_3 be a random sample of size 3 drawn from a population with mean μ and variance σ^2. Find the efficiency of $\frac{X_1 + 2X_2 + X_3}{4}$ relative to $\frac{X_1 + X_2 + X_3}{3}$.

23. Discuss large sample test for testing the equality of two population proportions.

24. A plastic manufacturer tests the tensile strength of different types of polythene material. A sample of three measurements is taken for each material type and data in pounds per square inch are as follows :

Type 1	200	215	218
Type 2	260	255	277
Type 3	245	248	272

Determine if the mean tensile strength of the three different types of material differ significantly.