K25U 0979

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular) Examination, April 2025

(2023 Admissions)

COMPLEMENTARY ELECTIVE COURSE IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

4C04STA – AIML : INFERENTIAL STATISTICS

Time : 3 Hours Max. Marks : 40

PART – A

(Short Answer)

Answer **all** questions. **Each** question carries 1 mark. (6×1=6)

1. Define interval estimation.
2. What is Neyman-Pearson lemma ?
3. Define the term 'critical value' in hypothesis testing.
4. What is meant by total sum of squares in ANOVA ?
5. State one advantage of non-parametric tests over parametric tests.
6. What is the purpose of a confidence interval for mean in estimation ?

PART – B

(Short Essay)

Answer **any six** questions. **Each** question carries **2** marks. (6×2=12)

7. Explain the relationship between confidence level and confidence interval.
8. What are the properties of Maximum Likelihood Estimators (MLE) ?
9. Describe the concept of the size of a test in hypothesis testing.
10. Differentiate between a paired and an independent sample t-test.

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11. Explain the significance of the F-distribution in statistics.

12. What are the differences between parametric and non-parametric ANOVA ?

13. Discuss the importance of statistical hypothesis testing in scientific research.

14. Explain the concept of sum of squares decomposition in ANOVA.

PART – C
(Essay)

Answer **any four** questions. **Each** question carries **3** marks. **(4×3=12)**

15. Discuss the importance of sufficiency in an estimator with an example.

16. How do you construct a confidence interval for the difference between two proportions ?

17. Explain the concept of likelihood function with an example.

18. Describe how hypothesis testing is applied in business decision-making.

19. Explain the steps involved in performing a Mann-Whitney U test.

20. How does the Kruskal-Wallis test differ from one-way ANOVA ?

PART – D
(Long Essay)

Answer **any two** questions. **Each** question carries **5** marks. **(2×5=10)**

21. Explain the different types of hypothesis tests and their applications.

22. Discuss the concept of the Analysis of Variance (ANOVA) table in detail with an example.

23. Describe the process of conducting an F-test for equality of variances.

24. Explain the relationship between Type I error, Type II error and the power of a test.