



K26U 1050

Reg. No. :

Name :

IV Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Supplementary/
Improvement) Examination, April 2026
(2020 to 2023 Admissions)

COMPLEMENTARY ELECTIVE COURSE IN STATISTICS FOR
MATHEMATICS/COMPUTER SCIENCE/COMPUTER SCIENCE WITH
AI AND ML
4C04STA : Statistical Inference

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 Convergence in probability.
2. Define Estimate.
3. State Neymann factorisation theorem for a sufficient estimator.
4. What is the difference between parameter and statistic ?
5. What are the two types of errors ?
6. Write down the assumptions of t-test.

PART – B
(Short Essay)

Answer **any 6** questions.

(6×2=12)

7. State weak law of large numbers.
8. What is the difference between point estimation and interval estimation ?
9. If X_1, X_2, X_3, X_4 is a random sample of size 4 from a Poisson distribution with parameter m . Show that $T_1 = \frac{X_1 + X_2 + X_3 + X_4}{4}$ and $T_2 = \frac{2X_1 + 3X_3}{5}$ are both unbiased. Which one is relatively more efficient ?

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10. Obtain 95% Confidence interval for mean when σ is known of a Normal population $N(\mu, \sigma)$.
11. Explain Null hypothesis and Alternative hypothesis.
12. What are the steps involved in testing of a hypothesis ?
13. What do you mean by most powerful test ?
14. What is analysis of variance ? Give a practical situation where ANOVA can be applied.

PART – C
(Essay)

Answer **any 4** questions.

(4×3=12)

15. State and prove Chebyshev's inequality.
16. Show that sample variance s^2 is a consistent estimator for σ^2 .
17. Prove that $\bar{X}$ is sufficient for P when $X \rightarrow B(N, P)$.
18. In a sample of 532 individuals selected at random from a population, 89 have been found to have RH negative blood. Find the interval estimate of the proportion of individuals in the population with RH negative blood and 95% Confidence.
19. If $X \geq 1$ is a critical region for testing $H_0: \theta = 2$ against $H_1: \theta = 1$ on the basis of a single observation from $f(x, \theta) = \theta e^{-\theta x}, x \geq 0$. Obtain probability of type I and type II errors.
20. What is meant by paired t test ?

PART – D
(Long Essay)

Answer **any 2** questions.

(2×5=10)

21. a) State and prove Bernoulli's law of large numbers.
b) A random variable X has mean 50 and variance 100. Use Chebyshev's inequality to obtain appropriate bound for $P\{|x - 50| \geq 15\}$.



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22. Explain method of maximum likelihood and method of moments for estimation.
23. a) Explain the Chi-square test of independence of two attributes.
b) Consider the following table

B/A	Male	Female
Educated	7	1
Not Educated	6	8

Apply Chi-square test at 5% Level of Significance, whether the two attributes A and B are independent.

24. Below are given the yield (in kg) per acre for 5 trial plots at four varieties of treatment carries out an analysis of variance and state your conclusion.

Plot Number	Treatment			
	1	2	3	4
1	62	48	68	80
2	60	66	52	94
3	62	68	76	78
4	34	78	64	82
5	78	70	70	66