

D 120597

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Name.....

Reg. No.....

**FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2025**

Statistics

STA 4C 04—STATISTICAL INFERENCE AND QUALITY CONTROL

(2019—2023 Admissions)

Time : Two Hours

Maximum : 60 Marks

*Use of Calculator and Statistical table are permitted.***Section A (Short Answer Type Questions)***All questions can be attended.**Each questions carries 2 marks.**Overall Ceiling 20 marks.*

1. Distinguish between an estimator and an estimate.
2. Define Unbiasedness.
3. What do you mean by confidence level ?
4. Give the confidence interval for μ where samples are taken from Normal population with unknown variance ?
5. Give any three unbiased estimate for the mean of a Poisson distribution.
6. Define Type I and Type II error.
7. Give the test statistic in the case of small sample test to test whether the mean of a normal population has a specified value, (1) when population SD is known ; and (2) when population SD is unknown.
8. Explain composite hypothesis with an example.
9. Define ordinary sign test.
10. State the assumptions to be followed in one- way ANOVA.
11. What do you mean by Statistical Quality Control ?
12. Define tolerance limits.

(Ceiling 20 marks)

Turn over

Section B (Short Essay/Paragraph Type Questions)

All questions can be attended.

Each questions carries 5 marks.

Overall Ceiling 30 marks.

13. If the random variable X has p.d.f $f(x) = (\beta + 1)x^\beta$, $0 \leq x \leq 1$, $\beta > 0$, obtain the m.l.e of β .
14. A random sample of size 15 from a normal population gives $\bar{x} = 3.2$ and $S^2 = 4.24$. Determine 90 % confidence limits for σ^2 .
15. Explain the large sample test for the mean of a normal distribution has a specified value $(H_0 : \mu = \mu_0)$?
16. Explain the procedure of Kruskal - Wallis test.
17. The mean life of 100 fluorescent light tubes produced by a company is computed to be 1570 hours with standard deviation of 120 hours. The company claims that the average life of the tubes produced by the company is 1600 hours. Using the level of significance of 0.05, is the claim acceptable?
18. The mean yield of wheat from a district A was 210 kg with sd 10 kg per acre from a sample of 100 plots. In another district B, the mean yield was 200 kg with sd 12kg from a sample of 150 plots. Test whether there is any significant difference between the mean yield of the crops in the two districts
19. Distinguish between control chart for individual values and control chart for averages.

(Ceiling 30 marks)

Part C (Short Essay Type Questions)

*Answer any **one** question.*

The questions carries 10 marks.

20. a) Give the Important properties of maximum likelihood estimates.
- b) If 1.2, 2.6, 1.4, 3.6, 2.4, 2.5, 3.1, 3.9, 4.4, 4.9 are the sample observation from $N(\mu, \sigma^2)$ population, obtain the m.l.e's of μ and σ^2 .

21. a) Write a short note on chi square test of independence.
- b) Given the following data relating to social status and state of intelligence. Test whether intelligence is related to social status :

	Dull	Average	Brilliant	Total
Lower middle	22	35	23	80
Middle	38	70	32	140
Upper middle	60	20	20	100
Total	120	125	75	320

(1 × 10 = 10 marks)