

D 103085

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Name.....

Reg. No.....

**FOURTH SEMESTER (CBCSS-UG) DEGREE EXAMINATION
APRIL 2024**

Statistics

STA4C04—STATISTICAL INFERENCE AND QUALITY CONTROL

(2019 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

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

1. What is a likelihood function ?
2. Define consistency.
3. Construct the large sample confidence interval for the proportion of a binomial population.
4. If t is consistent for an unknown parameter θ whether t^2 is consistent for θ^2 ?
5. The mean and SD of sample of size 60 are 145 and 40. Construct 95% confidence interval for the population mean.
6. Write a note on Standard Error.
7. Write down the test statistic for testing the equality of means of two populations when the population SDs (1) σ_1 and σ_2 are known (2) σ_1 and σ_2 are unknown for a large sample.
8. Distinguish between null and alternative hypothesis.
9. What adjustment has to be made for ties in Kruskal - Wallis Statistic ?
10. Define median test.
11. Which are the control charts for variables ?
12. Describe U charts.

(Ceiling 20 marks)

Turn over

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Section B (Short Essay/Paragraph Type Questions)

Each questions carries 5 marks.

All questions can be attended.

Overall Ceiling 30 marks

13. Find the m.l.e for the parameter θ given the p.d.f $f(x) = \theta e^{-\theta x}, x \geq 0, \theta > 0$.
14. If 8.6, 7.9, 8.3, 6.4, 8.4, 9.8, 7.2, 7.8, 7.5 are the observed values of a random sample of size 9 from $N(\mu, \sigma^2)$, construct 90 % confidence limits for μ .
15. Describe the procedure for testing of homogeneity.
16. How will you test the equality of two proportion of items in the same class on the basis of two independent samples drawn from two populations?
17. Explain one way ANOVA test procedure with ANOVA table.
18. A stenographer claims that she can take dictations at the rate of more than 120 words per minute. Of the 12 tests given to her she could perform an average of 135 words with a standard deviation of 40. Is her claim valid ($\alpha = 0.01$).
19. Explain the applicability of an R chart.

(Ceiling 30 marks)

Part C (Short Essay Type Questions)

Answer any one question.

The question carries 10 marks.

20. Find the maximum likelihood estimators for random sampling from a normal population $N(\mu, \sigma^2)$ for :
 - (a) Population mean μ when population variance σ^2 is known.
 - (b) Population variance σ^2 when population mean μ is known.
 - (c) The simultaneous estimation of both the population mean and variance.

21. A group of 10 children were tested to find out how many digits they could repeat from memory after hearing them once. They were given practise at this test during the next week and were then tested.

- a) Is the difference of the performance of the 10 children at the two tests significant ?
b) Whether practise has improved the ability of remembrance ?

Child	A	B	C	D	E	F	G	H	I	J
Test I	6	5	4	7	8	6	7	5	6	8
Test II	7	7	6	7	9	6	8	6	6	10

(1 × 10 = 10 marks)