FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U STA4 C04 - STATISTICAL INFERENCE AND QUALITY CONTROL

(Statistics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours   Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. State Fisher Neymann factorization theorem.

2. Define unbiasedness of estimators.

3. State the sufficient condition for consistency.

4. $V(t_1)$ = 20.22 and $V(t_2)$= 12. Compute the relative efficiency of t_2 with respect to t_1 .

5. Find the likelihood function of binomial population.

6. What is a statistical hypothesis?

7. State the critical region for testing the equality of a population mean.

8. Write the test statistics used for the test $H_0 : \mu = \mu_0$ against $H_0 : \mu \neq \mu_0$.

9. Write the test statistic used for testing the equality of variances.

10. Which test used in ANOVA table?

11. Briefly explain sign test.

12. Write down the control limits for np- chart.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. Estimate the parameter by the method of moments for a poisson population.

14. Obtain $100(1 - \alpha)$ % population confidence interval for the mean of a normal population with unknowm variance on the basis of a small sample of size 'n' taken from the population.

15. Explain the method of constructing 95% confidence interval for the proportion 'p' of possessing a characteristic in a population.

16. The average of scores obtained by 10 students of a college in a competitive exam is 57. Do this data indicate that the average of the scores obtained by all students who appeared the exam is less than 60 if the population s.d. is 2.75?

17. What are the applications of chi-square test? Also explain goodness of fit.

18. Describe Wilcoxon matched pair sign test.

19. How will you construct Mean chart?

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any *one* question. The question carries 10 marks.

20. Obtain the maximum likelihood estimator for θ for the distribution, $f(x,\theta) = \frac{1}{\theta}e^{-\frac{x}{\theta}}, x \geq 0, \theta > 0$ and show that the estimator is a consistent one.

21. A test was given to give students taken at random from the fifth class of three schools of a town. The individual scores are :

School I : 9   7   6   5   8
School I : 7   4   5   4   5
School I : 6   5   6   7   6

Carry out the analysis of variance and state your conclusions.

(1 × 10 = 10 Marks)

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