

21U5113

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Name:

Reg.No:

FIFTH SEMESTER B.Voc. DEGREE EXAMINATION, NOVEMBER 2023

(CBCSS - UG)

CC21U SDC5 SI14 - STATISTICAL INFERENCE

(Information Technology)

(2021 Admission - Regular)

Time : 2.5 Hours

Maximum : 80 Marks

Credit : 4

Part A (Short answer questions)

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

1. What is point estimate?
2. What is sufficiency?
3. List the properties of mle.
4. Write down the confidence interval for the mean of two normal populations when the standard deviations are known.
5. Interpret the confidence interval for the variance of a normal population.
6. Define level of significance.
7. Give an example for simple hypothesis.
8. What is a one-tailed test in hypothesis testing?
9. What is best critical region?
10. How will you decide the bestcritical regions of a Z-test?
11. What are the two main types of t-tests?
12. What is the F-test in statistics?
13. What are non-parametric tests?
14. Explain the term ANOVA.
15. In a sequence of measurements, you have the values :12, 14, 14, 15, 15, 15, 16, 16, 17, 18, 18, 18, 19. Calculate the number of runs .

(Ceiling: 25 Marks)

Part B (Paragraph questions)

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

16. Let x_1, x_2, \dots, x_n be a random samples drawn from a given population with mean μ and variance σ^2 . Show that the sample mean \bar{x} is an unbiased estimator of population mean μ
17. Estimate p in a sampling from binomial population $f(x, n, p) = nC_x p^x q^{n-x}, x = 0, 1, 2, \dots, n$ by method of moments.
18. A sample of 25 test scores from a normal distribution. The sample variance is 16. Calculate a 95% confidence interval for the population variance.
19. A box is known to contain either 3 red and 5 black balls or 5 red and 3 black balls. Three balls are to be drawn at random and it is concluded that the former is true if the number of red balls is less than 3 in the sample. Find α and β , the probabilities of two types of error
20. A manufacturer claims that the mean weight of their cereal boxes is 500 grams. You take a random sample of 36 cereal boxes and find a sample mean weight of 498 grams with a sample standard deviation of 10 grams. Perform an appropriate test at a 5% significance level to determine if there is enough evidence to reject the manufacturer's claim.
21. The people of an island are supposed to belong to the four blood groups O,A,B and AB in the ratio 4:12:5:4. A sample of 770 persons showed that 180 belonged to O, 360 belonged to A, 132 belonged to B and 98 belonged to AB. Does the sample support the assumption?
22. Explain sign test.
23. Explain the relationship between the Kruskal-Wallis test and the Mann-Whitney U test.

(Ceiling: 35 Marks)

Part C (Essay questions)

Answer any *two* questions. Each question carries 10 marks.

24. Describe the desirable properties of a good estimator.
25. (a) Explain the procedure for testing the proportion of success of a population.(b) In a survey of 250 people, 160 said they prefer product A. Is there enough evidence to suggest that more than 60% of people prefer product A at a significance level of 0.05?
26. Describe the procedure of two way ANOVA.
27. For following dataset of paired observations given below perform the Wilcoxon signed-rank test Before: [23, 28, 20, 35, 29]After: [27, 30, 24, 40, 32].

(2 × 10 = 20 Marks)
