

Reg. No. :

Name :

**V Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/
Improvement) Examination, November 2025
(2019 to 2023 Admissions)
CORE COURSE IN STATISTICS
5B05 STA : Statistical Inference – II**

Time : 3 Hours

Max. Marks : 48

**PART – A
(Short Answer)**

Answer **all 6** questions.

(6×1=6)

1. Define p-value.
2. A test procedure is suggested to reject H_0 if their sample mean is greater than 6. Identify the critical region of this test.
3. Give the test statistic for one sample z-test for mean.
4. Give the test statistic for testing mean of a normal population when s.d. is unknown and sample size is small.
5. Give two applications of chi-square test.
6. State the underlying assumptions for Wilcoxon signed rank test.

**PART – B
(Short Essay)**

Answer **any 7** questions.

(7×2=14)

7. Define simple and composite hypothesis with an example of each.
8. State uniformly most powerful test.
9. Define level of significance and size of a test.

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10. Stating the assumptions, explain paired t-test.
11. The sample correlation coefficient between two variables for a sample of size 11 is found to be 0.78. Test whether there is a significant linear correlation between those variables under 5% level of significance.
12. In a sample of 100 people the number of those suffering from covid-19 was found to be 5. Does this contradict the assumption that the proportion of covid-19 patients in the whole population is less than 0.04. (Use $\alpha = 0.05$).
13. Describe the test for homogeneity.
14. Compare parametric and non-parametric tests.
15. Explain the use of Q-Q plot.

**PART – C
(Essay)**

Answer **any 4** questions.

(4×4=16)

16. Explain the likelihood ratio test.
17. Let p be the probability that a coin will fall head in a single toss in order to test $H_0 : p = \frac{1}{2}$ against test $H_1 : p = \frac{3}{4}$. The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Find the probability of type I error and power of the test.
18. Obtain a test procedure for testing the significance of correlation coefficient.
19. Explain the test for the significance of variance from a sample.
20. The following data was obtained in an investigation about the effect of vaccination for small pox. Examine whether vaccination is effective in preventing small pox.

	Vaccinated	Not Vaccinated
Attacked by small pox	3	12
Not attacked	8	5

21. Explain Kolmogrov-Smirnov test for two samples.

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**PART – D
(Long Essay)**

Answer **any 2** questions.

(2×6=12)

22. Obtain the most powerful test for testing $H_0 : \mu = \mu_0$ against $H_1 : \mu = \mu_1$ ($\mu_1 > \mu_0$) based on a random sample of size n from $N(\mu, \sigma^2)$, σ^2 is known.
23. Describe the test procedure for testing equality of means of two normal populations when the population variances are equal and unknown.
24. Describe the test for equality of variances stating its assumptions.
25. Explain Kruskal-Wallis test.