



K23U 2382

Reg. No. :

Name :

**V Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/
Improvement) Examination, November 2023
(2019 – 2021 Admissions)
CORE COURSE IN STATISTICS
5B05 STA : Statistical Inference – II**

Time : 3 Hours

Max. Marks : 48

Instruction : Use of calculators and statistical tables are **permitted**.

PART – A

Answer **all** questions. **Each** carries **1** mark.

(6×1=6)

1. Define P-value.
2. When do you say that a hypothesis is composite ?
3. The degrees of freedom for a 't' test for testing significance of sample correlation coefficient based on 15 observations of a bivariate data is
4. Name a test used for testing goodness of fit.
5. The lower line in the box of a vertical box plot represents
6. Name a test to check for normality of a data.

PART – B

Answer **any 7** questions. **Each** carries **2** marks.

(7×2=14)

7. What do you mean by likelihood ratio test ?
8. Define significance level.
9. What do you mean by uniformly most powerful test ? Give an example.

P.T.O.



10. Write down the test statistic for testing equality of proportions and its probability distribution.
11. How do you test the significance of a sample proportion ?
12. The frequency distribution of numbers shown when a die was thrown 120 times is as given below.

| | | | | | | |
|---------------------|----|----|----|----|----|----|
| Number Shown | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency | 24 | 14 | 26 | 20 | 16 | 20 |

Test whether the die is unbiased or not. (Take $\alpha = 0.01$)

13. State the application of 't' distribution in tests of statistical hypothesis.
14. Distinguish between parametric tests and non-parametric tests.
15. Explain signed rank test.

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PART – C

Answer **any 4** questions. **Each** carries **4** marks.

(4×4=16)

16. A population has the probability density function $f(x) = \frac{1}{\theta}, 0 < x < \theta$. To test the null hypothesis $\theta = 2$ against the alternative hypothesis $\theta = 3$ based on a single observation X . $X \geq 1.8$ is used as the critical region. Find the size and power of the test.
17. State and prove Neymann-Pearson lemma.
18. Describe Student's 't' test for testing the equality of means of two normal populations.
19. There were 280 respondents in a survey conducted in a village. Among them, 130 were smokers. Test the hypothesis that 50% of the people in the village are smokers at 1% level of significance.
20. Explain 'F' test for equality of variances.
21. Describe sign test.



PART – D

Answer **any 2** questions. **Each** carries **6** marks.

(2×6=12)

- 22. Derive the most powerful critical region for testing $H_0 : \mu = \mu_0$ against $H_1 : \mu = \mu_1$, where $\mu_1 < \mu_0$ in $N(\mu, \sigma)$ (σ known).
- 23. The blood sugar levels of 10 patients were found to be 230, 248, 245, 246, 235, 243, 260, 273, 262, 265 mg/dL. They were given a newly introduced drug for lowering the blood sugar level. The sugar levels after medication are 180, 195, 205, 201, 183, 196, 210, 215, 206, 208 mg/dL respectively. Test whether the drug is effective or not, at 5% level of significance, assuming that blood sugar levels are normally distributed.
- 24. The following table shows the results of a survey conducted to study about the awareness of people about chronic kidney disease. Test whether education and awareness are associated or not. (Take $\alpha = 0.05$)

| Awareness \ Education | Excellent | Good | Average | Poor |
|----------------------------|-----------|------|---------|------|
| Upto 10 th Std. | 25 | 18 | 13 | 4 |
| Graduate | 28 | 22 | 19 | 6 |
| Post Graduate | 35 | 26 | 19 | 5 |

- 25. Explain Kruskal-Wallis test.

