K22U 2610

Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (CBCSS – OBE-Regular/Supplementary/ Improvement) Examination, November 2022
(2019 Admission Onwards)
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 null hypothesis.
2. When do you say that a hypothesis is simple ?
3. The degrees of freedom for an F test for testing equality of variances of two normal populations based on samples of sizes 10 and 13 is
4. Name a test used for testing independence of attributes.
5. The central line in the box of a box plot represents the
6. Name a graphical method to check for normality.

PART – B

Answer **any 7** questions. **Each** carries **2** marks. **(7×2=14)**

7. Discuss the concept of critical region.
8. State Neyman – Pearson's lemma and give its utility.
9. What do you mean by uniformly most powerful test ? Give an example.
10. What are the assumptions in Student's t test ?

P.T.O.

11. How do you test the significance of correlation coefficient ?
12. The frequency distribution of numbers shown when a die was thrown 60 times is as given below.

Number Shown	1	2	3	4	5	6
Frequency	12	7	13	10	8	10

Test whether the die is unbiased or not. (Take $\alpha = 0.05$)

13. State the application of F distribution in tests of statistical hypothesis.
14. What are the advantages of non-parametric tests over parametric tests ?
15. Explain sign test.

PART – C

Answer **any 4** questions. **Each** carries **4** marks. **(4×4=16)**

16. A population has the probability density function $f(x) = \frac{1}{2}, \theta - 1 < x < \theta + 1$. To test the null hypothesis $\theta = 5$ against the alternative hypothesis $\theta = 6$ based on a sample of size one, it is suggested to reject the hypothesis if $x \geq 5.5$. Find the size and power of the test.
17. Explain likelihood ratio test. Give its properties.
18. Stating clearly the assumptions, describe Student's t test for testing the equality of means of two normal populations.
19. There were 250 respondents in a survey conducted in a village. Among them, 110 were smokers. Test the hypothesis that 50% of the people in the village are smokers at 5% level of significance.
20. Explain chi-square test of goodness of fit.
21. Describe the Wilcoxon signed rank 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) where σ is the standard deviation.
23. The serum cholesterol levels of 10 patients were found to be 232, 258, 241, 248, 237, 240, 259, 274, 264, 266 mg/dL. They were asked to a practice special kind of exercise for a period of 1 month. After this one-month period of exercise, their cholesterol levels were measured again and found to be 220, 255, 237, 240, 225, 232, 258, 270, 255, 256 mg/dL respectively. Test whether the exercise is effective or not, at 5% level of significance, assuming that cholesterol levels are normally distributed.
24. The following table shows the results of a survey conducted to study about the awareness of people about Covid – 19 pandemic. Test whether education and awareness are associated or not. (Take $\alpha = 0.01$)

Education \ Awareness	Excellent	Good	Average	Poor
Upto 10th Std.	20	15	11	9
Graduate	25	18	16	7
Post Graduate	32	24	18	5

25. Explain two sample Kolmogorov-Smirnov test.

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