



K20U 0902

Reg. No. :

Name :

IV Semester B.Sc. Degree (CBCSS – Reg./Sup./Imp.)

Examination, April 2020

(2014 Admn. Onwards)

COMPLEMENTARY COURSE IN STATISTICS

4C04 STA (G and P) : Statistical Inference

Time : 3 Hours

Max. Marks : 40

Instruction : Use of **Calculators** and **Statistical** tables are permitted.

PART – A

(Short answer)

Answer **all** the **6** questions.

(6×1=6)

1. Define a statistic. Give an example for it.
2. Define consistency.
3. Explain method of moments.
4. Distinguish simple and composite hypothesis.
5. Define power of a test.
6. Write the test statistic for testing the equality of means for a small sample when the population variance is unknown.

PART – B

(Short essay)

Answer **any** 6 questions.

(6×2=12)

7. Define unbiasedness. Is it unique ? Justify your answer.
8. Distinguish between point estimation and interval estimation.

P.T.O.



9. Distinguish between one tailed and two tailed test.
10. State Neyman-Pearson theorem.
11. In a sample of 60 items, 8 are damaged. Construct a 95% confidence interval for the true proportion of damaged items.
12. Nine observations taken from a normal population are 83, 102, 93, 97, 99, 101, 86, 77 and 79. Based on this sample can you conclude that the population mean is greater than 94 given that the first kind of error is 0.05.
13. Explain paired t-test.
14. Describe the assumptions in ANOVA.

PART – C
(Essay)

Answer **any 4** questions.

(4×3=12)

15. Discuss the properties of maximum likelihood estimators. Find the maximum likelihood estimator of Poisson parameter λ of Poisson distribution.
16. Explain briefly the procedure followed in tests of statistical hypothesis.
17. The following are the marks obtained by 10 students in a certain examination :
Marks : 43, 48, 65, 57, 31, 60, 37, 48, 78, 59.
Test the hypothesis that population variance is 100 at 1% level of significance.
18. The mean of two random samples of sizes 1000 and 2000 are 67.5 and 68.0 inches respectively. If the standard deviations of the samples are 4.5 and 3.8 respectively. Examine whether means of the respective population are significantly at 5% level.
19. Explain the Chi-square for goodness of fit.
20. Distinguish between one-way and two-way classification models and explain the procedure followed for carrying out analysis of variance.



PART – D
(Long Essay)

Answer **any 2** questions.

(2×5=10)

21. Explain confidence interval. Obtain $100(1 - \alpha)\%$ confidence interval for the difference of means of two normal populations when the population variance are unknown.
22. If $X \geq 1$ is the critical region for testing $H_0 : \theta = 2$ against $H_1 : \theta = 1$ on the basis of a single observation from $f(x; \theta) = \theta e^{-\theta x}$, $x \geq 0$. Obtain the probabilities of Type I and Type II errors.
23. Gain in weights for groups of rats fed on two types of diets are as follows :
- Diet A :** 13 14 10 11 12 16 10 8
- Diet B :** 7 10 12 8 10 11 10 9 11
- Test the effect of diet in gain in weights at 1% level of significance.
24. Three different methods of analysis M1, M2, M3 are used to determine in parts per million the amount of a certain constituent in the sample. Each method is used by five analysts and the results are given below :

		Method		
		M1	M2	M3
Analyst	1	7.5	7.0	7.1
	2	7.4	7.2	6.7
	3	7.3	7.0	6.9
	4	7.6	7.2	6.8
	5	7.4	7.1	6.9

Do these results indicate a significant variation either between the methods or between the analysts ?
