Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CBCSS – Sup./Imp.) Examination, April 2021
(2014 – '18 Admissions)
COMPLEMENTARY COURSE IN STATISTICS
4C04STA (G&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 parameter. Give an example for it.

2. Define unbiasedness.

3. Explain method of moments.

4. Define simple hypothesis.

5. Define size of a test.

6. Write are the requirements of a good experimental design.

PART – B

(Short Essay)

Answer **all** the 6 questions.

(6×2=12)

7. Define consistency. Show that sample variance is a consistent estimator of the population variance in the case of normal population $N(\mu, \sigma^2)$.

8. Distinguish between point estimation and interval estimation.

9. Explain two tailed test.

10. State Neyman-Pearson theorem.

11. A random sample of size 10 from a normal population with standard deviation 5 give the following observation 65, 72, 71, 85, 73, 76, 67, 70, 74 and 76. Calculate the 95% confidence interval for the population mean.

12. A random sample of 16 values from a normal population showed a mean of 41.5 inches and the sum of squares of deviations from this mean equal to 135 square inches. Show that the assumption of a mean of 43.5 inches for the population is not reasonable.

13. Explain chi square test for population variance.

14. Describe the assumptions in ANOVA.

PART – C
(Essay)

Answer **any 4** questions. (4×3=12)

15. Define Sufficiency. Show that sample mean is sufficient for estimating the parameter λ in the Poisson distribution.

16. Explain briefly the procedure followed in tests of statistical hypothesis.

17. In a certain experiment to compare two types of animal foods A and B, the following results of increase in weights were observed in animals :

    Food A :   49,   53,   51,   52,   47,   50,   52,   53

    Food B :   52,   55,   52,   53,   50,   54,   54,   53

    Examine the increase in weight, when the same set of eight animals where used in both the foods.

18. Two independent samples of 8 and 7 items respectively had the following values :

    Sample I :   9,   11,   13,   11,   15,   9,   12,   14

    Sample II :   10,   12,   10,   14,   9,   8,   10

    Is the difference between the means of samples significant ?

19. Explain the Chi-square test for independence of attributes.

20. The following figures relate to production in Kg. of three varieties A, B and C of wheat sown in 12 plots.

    A :   14,   16,   18

    B :   14,   13,   15,   22

    C :   18,   16,   16,   19,   20

    Is there any significant difference in the production of 3 varieties.

PART – D

(Long Essay)

Answer **any 2** questions.

$(2 \times 5 = 10)$

21. Explain confidence interval. Obtain 99% confidence interval for the difference of means of two normal populations when the population variance are known.

22. Let p be the probability that a coin will fall head in a single toss in order to test $H_0 : = p = 0.5$ against $H_1 : p = 0.75$. 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.

23. 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.

24. The data given below show the birth weights of babies born, classified according to the age of mother and order of gravida. Test whether the age of mother and order of gravida significantly affect the birth-weight.

Order of gravida	Age group of mother				
	15 – 20	20 –25	25 – 30	30 – 35	35 and above
1	14.9	15.4	15.1	14.8	15.0
2	15.8	16.1	15.7	15.7	15.4
3	17.4	18.1	17.6	16.8	16.8
4	17.9	18.7	18.1	17.3	16.9
5	18.0	18.4	17.7	17.4	17.7