B.Sc DEGREE (CBCS) EXAMINATIONS , OCTOBER 2021

Fourth Semester

B.Sc Psychology Model I

Complementary Course - ST4CMT24 - STATISTICS -STATISTICAL INFERENCE

2019 Admission only

17864B46

Time: 3 Hours   Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. What is meant by statistical hypothesis?

2. What do you mean by P value?

3. What do you mean by two tailed test?

4. What is the standard error for testing the equality of means of two populations based on large samples when the standard deviations are unknown and equal.

5. Define the test statistic for testing equality of proportions in two populations based on large sample.

6. Define Chi-square test statistic.

7. State the hypothesis you test using the Chi-square statistic in a contingency table.

8. Describe the method of testing $H_0: \mu = \mu_0$ Vs $H_1: \mu \neq \mu_0$ in a normal population with mean μ and variance unity.

9. Give the statistic under the null hypothesis of testing the difference of means of two normal populations for small sample, when σ known

10. Give the statistic under the null hypothesis of testing the difference of means of two normal population for small sample, when σ unknown.

11. Explain small sample tests with example.

12. Explain the use of Students t distribution.

(10×2=20)

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Distinguish between the two types of errors in testing of hypothesis?

14. What is the contribution of standard error in testing of hypothesis?

15. Define statistical test.

16. Define the term 'standard error'and explain how the concept is useful in large sample tests.

17. Explain the method of testing the mean of a large sample population .

18. In a sample of 100 people the number of those suffering from T.B was found to be 5. Does this contradict the assumption that the proportion of T.B patients in the whole population is less than 0.04. ($\alpha = 0.05$)

19. Six coins of the same type are discovered at an archaeological site. If their weights on average are significantly different from 5.25 grams then it can be assumed that their provenance is not the site itself. The coins are weighed and have mean 4.73 g with sample standard deviation 0.18 g. Perform the relevant test at the 0.1% ($1/10^{th}$ of 1%) level of significance, assuming a normal distribution of weights of all such coins.

20. A group of 10 children were tested to find out how many digits they could repeat from memory after hearing them once. They were given practice at this test during the next week and were then tested. Is the difference of the performance of the 10 children at the 2 tests significant?

       Test 1: 6   5   4   7   8   6   7   5   6   8
       Test 2: 7   7   6   7   9   6   8   6   6   10

21. Discuss briefly the different applications of Chi- square as a test statistic.

                                                                    (6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. A sample of 200 boys who passed S.S.L.C examination are found to have mean marks 50 with S.D 5 for English. The mean marks of 100 girls was found to be 48 with S.D 4.

Does this indicate any significant difference between the abilities of boys and girls assuming the S.D the same. (α = 0.05)

23. Below is given the distribution of hair colours for either sex in a university.

Hair colour	Fair	Red	Medium	Dark	Jet black	Total
Boys	592	119	849	504	36	2100
Girls	544	97	677	451	14	1783
Total	1136	216	1526	955	50	3883

Test the homogeneity of hair for either sex at 5% significance level.

24. 12 students were given intensive coaching and 5 tests were conducted in a month. The scores of tests 1 and 5 are given below. Does the scores from the 1 to 5 show an improvement ?

No. of Students	1	2	3	4	5	6	7	8	9	10	11
Test 1	50	42	51	26	35	42	60	41	70	55	62
Test 1	62	40	61	35	30	52	68	51	84	63	72

25. The following figures give the prices in rupees of a certain commodity in a sample of shops selected at random from a city A. Assuming the distribution of prices to be normal, examine whether the standard deviation of prices is 0.3.

7.41, 7.77, 7.44, 7.40, 7.38, 7.93, 7.58, 8.28, 7.23, 7.52, 7.82, 7.71, 7.84, 7.63, 7.68

(2×15=30)