TB244298G

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2024

2022 ADMISSIONS REGULAR

SEMESTER IV - COMPLEMENTARY COURSE 2 (STATISTICS FOR PSYCHOLOGY)

PY4CMT12 - Statistical Inference

Time : 3 Hours **Maximum Marks : 80**

Part A

I. Answer any Ten questions. Each question carries 2 marks **(10x2=20)**

1. Give an example for population and sample
2. Define sample
3. Define type 1 error
4. Define Statistical Population
5. State the statistic to test $\mu = \mu_0$ with known population standard deviation when sample size is large and its distribution.
6. State the statistic to test $\mu_1 = \mu_2$ with unequal and known population standard deviations when sample size is large.
7. Differentiate between one tailed z-test and two tailed z-test.
8. Write and draw the critical region of the test $p_1 = p_2$ against $p_1 < p_2$.
9. Write down the t-statistic to test the equality of two population means.
10. Which are the statistics used in small sample tests.
11. If the value of the Chi-square statistic with 2 degrees of freedom at 5% level is 3.15 what will be your conclussion? Justify.
12. To test the equality of two population variances at 5% level the value of F-statistic with degrees of freedom 9 and 11 respectively is 1.018. Is this significant?

Part B

II. Answer any Six questions. Each question carries 5 marks **(6x5=30)**

13. What are the different types of hypothesis in a hypothesis testing? Explain in detail
14. Give the various steps involved in hypothesis testing
15. Distinguish between power of the test and Size of the test
16. Describe Chi-square test for independence of attributes.
17. Explain the large sample test of equality of the mean of two populations when the population standard deviations are unequal and unknown.
18. In a sample of 1,000 people in Maharashtra, 540 are rice eaters and rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this State at 1% level of significance?
19. The amount of a certain trace element in blood is known to vary with a standard deviation of 14.1 ppm (parts per million) for male blood donors and 9.5 ppm for female donors. Random samples of 75 male and 50 female donors yield concentration means of 28 and 33 ppm, respectively. Test the hypothesis that the population means of concentrations of the element are the same for men and women?
20. Explain the differences between t-test and z-test in small sample test to test $\mu = \mu_0$, by stating the test statistic.

21. The mean weekly sales of soap bars in departmental stores was 146.3 bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increased to 153.7 and showed a standard deviation of 17.2. Was the advertising campaign successful?

Part C

III. Answer any Two questions. Each question carries 15 marks **(2x15=30)**

22. A population has a pdf f(x) where

f(X)=1/4, $\theta-2 \leq x \leq \theta+2$.

To test $H_0: \theta=5$ against $H_1: \theta=8$ based on a sample of size 1 , it is suggested to reject the hypothesis if $x \geq 6$. Find the significance level and power of the test

23. Do male and female college students have the same distribution of living conditions? Use a level of significance of 0.05. Suppose that 250 randomly selected male college students and 300 randomly selected female college students were asked about their living conditions: Dorm, Apartment, With Parents, Other.The results are shown in the table below:

	Dorm	Apartment	With Parents	Other
Male	72	84	49	45
Female	91	86	88	35

24. a) Write down the applications of Chi-square statistic. b) Explain the one sample test regarding population variance.

25. a) Below are given the gain in weights (in kgs.) of pigs fed on two diets A and B.

	Gain in weight
Diet A	25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25
Diet B	44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

Test, if the two diets differ significantly as regards their effect on increase in weight.

b) A sample of size 10 of men and another sample of size 12 of women have mean I.Q's 101 and 98 respectively. Assuming that the I.Q's of men and women are independently and normally distributed with mean μ_1 and μ_2 and standard deviations 4 and 3. Examine whether men are on the average more intelligent than women at 5% level.