PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Fifth Semester)

Branch – **STATISTICS**

STATISTICAL INFERENCE-II

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1. The probability of rejecting the null hypothesis when it is true is called
   (i)Level of confident (ii) Level of significance
   (iii) Power of the test (iv) Difficult to tell
2. Parameter space for testing $H_0 : \mu = \mu_0$ Vs $H_1 : \mu \neq \mu_0$ is.
   (i) $\Theta = \{\mu_1, \mu_2, \sigma^2\}$ (ii) $\Theta = \{\mu_1, \mu_2, \sigma_1^2, \sigma_2^2\}$
   (iii) $\Theta = \{\mu, \sigma^2\}$ (iv) $\Theta_0 = \{\mu, \sigma_1^2, \sigma_2^2\}$
3. A brilliant student is failed by an examiner, it is an example of
   (i) Type I error (ii) Type II error
   (iii) Power of the test (iv) Unbiased test
4. Reject the null hypothesis in testing H_0:$\mu = \mu 0$ Vs H_1: $\mu \neq \mu 0$with mean μ and unknown variance σ^2 of normal population if
   (i) $|t| = \left|\frac{\sqrt{n}(\bar{x}-\mu_0)}{s}\right| > t_{n-1}(\alpha/2)$ (ii) $|t| = \left|\frac{\sqrt{n}(\bar{x}-\mu_0)}{s}\right| < t_{n-1}(\alpha/2)$
   (iii) $|t| = \left|\frac{\sqrt{n}(\bar{x}-\mu_0)}{s}\right| > t_{n-1}(\alpha)$ (iv) $|t| = \left|\frac{\sqrt{n}(\bar{x}-\mu_0)}{s}\right| < t_{n-1}(\alpha)$
5. State the test statistics for testing single proportion
   i) $z = \frac{p-P_0}{\sqrt{\frac{P_0Q_0}{n}}}$ (ii) $z = \frac{p-P_0}{\sqrt{\frac{P_0Q_0}{n-1}}}$
   ii) (iii) $z = \frac{p+P_0}{\sqrt{\frac{P_0Q_0}{n}}}$ (iv) $z = \frac{p-P_0}{\sqrt{\frac{P_0Q_0}{n+1}}}$.
6. Mention the Critical value of two tailed test for z at 5 % level of significance
   (i) 2.58 (ii) 1.96 (iii) 1.645 (iv) 2.33
7. Identify the person who discovered t distribution
   (i)Karl pearson (ii) Laplace (iii) Fisher (iv) Gosset.
8. Choose the degrees of freedom for paired t test is
   (i)n-1 (ii) n-2 (iii) n (iv) n+1
9. An independent t-test can be used to assess which of the following?
   (i) It assesses difference between two groups of participants
   (ii) It assesses goodness of fit
   (iii) It assesses relationships between two ratio data sets
   (iv) It assesses difference between two standard deviations.
10. F test is used for testing
    (i) difference of two means
    (ii) difference of two standard deviations
    (iii) to compare theoretical and experimental observation
    (iv) testing single standard deviations.

Cont...

SECTION - B (35 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

11. a If $x \geq 1$ is the critical region for testing H_o: $\theta=2$ against the alternative $\theta=1$ on the basis of the single observation from the population, $f(x, \theta)= \theta \exp(-\theta x), 0 \leq x < \infty$. Calculate the values of type I error and type II errors.

(OR)

b Let p be the probability that coin will fail head in single toss in order to test H_o: $p=1/2$ against H_1: $p=3/4$. The coin is tossed 5 times and H_o is rejected if more than 3 heads are obtained. CalculateFind the probability of type I error and power of the test.

12. a Develop the UMPCR for testing H_o:$\mu= \mu_0$ Vs H_1: $\mu < \mu_0$ in normal distribution with mean μ and variance σ^2 using a random sample of size n.

(OR)

b Show that the LRT for testing the equality of variances of two normal distributions is the usual F test.

13. a. Explain the test procedure for testing equality of population correlation coefficients.

(OR)

b Describe the testing procedure for testing single proportion.

14. a. Outline χ^2 test for testing population variance.

(OR)

b Describe t test for equality of two single mean when samples are dependent.

15 a If A and B are independent state whether the data given below is positively associated or negatively associated. (A)=470, (B)=620, (AB)=320, N=1000.

(OR)

b For two attributes A and B we have (AB)=8; (A)=18;$(\alpha\beta)$ =5;N=35. Calculate Yule's coefficient of association.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16. State and Prove Neymann Pearson Lemma.

17. Obtain the problem of testing H_o:$\mu= \mu_0$ Vs H_1: $\mu \neq \mu_0$ with mean μ and unknown variance σ^2 of normal population.

18. Discuss the large sample test for testing the significance of difference of proportion

19. Summarise the steps in testing the significance of equality of two means.

20. Outline χ^2 test of independence of attributes.

Z-Z-Z END