

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2017
(Fifth Semester)

Branch - **STATISTICS**

STATISTICAL INFERENCE - II

Time : Three Hours

Maximum : 75 Marks

SECTION-A (20 Marks)

Answer **ALL** questions

ALL questions carry EQUAL marks (10 x 2 = 20)

- 1 Define simple hypothesis,
- 2 What is level of significance?
- 3 State any two properties of LR test.
- 4 Define UMPT.
- 5 What is standard error?
- 6 Write the formula for testing significance of equality of two means.
- 7 What are the applications of F distribution?
- 8 State the conditions for the validity of chi square test.
- 9 What is dichotomy?
- 10 What is association of attributes?

SECTION - B (25 Marks)

Answer **ALL** Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a Explain the steps involved in solving testing of hypothesis problem.
OR
b If $x > 1$ is the critical region for testing $H_0 : \theta = 2$ against the alternative $\theta = 1$, on the basis of the single observation from the population, $f(x, \theta) = \theta \exp(-\theta x)$, $0 < x < \infty$, obtain the values of type I and type II errors.
- 12 a What are the properties of LRT?
OR
b Examine whether a best critical region exists for testing the null hypothesis $H_0 : \theta = \theta_0$ against the alternative hypothesis $H_1 : \theta > \theta_0$ for the parameter θ of the distribution:
 $f(x, \theta) = 1 + \theta / (x + \theta)^2$, $1 < x < \infty$.
- 13 a What are the applications of t distribution?
OR
b A machinist is making engine parts with axle diameters of 0.700 inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a standard deviation of 0.040 inch. Compute the statistic you would use of test whether the work is meeting the specifications. Also state how you would proceed further.
- 14 a State and prove additive property of x variates.
OR
b In one sample of 8 observations, the sum of the squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations is was 102.6. Test whether this difference is significant at 5 percent level, given that the 5 percent point of F for $n_1 = 7$ and $n_2 = 9$ degrees of freedom is 3729.

Explain Yule's coefficient of association.

OR

800 candidates of both sexes appeared at an examination. The boys outnumbered the girls by 15% of the total. The number of candidates who passed exceed the number failed by 480. Equal number of boys and girls failed in the examination. Prepare a 2 x 2 table and find the coefficient of association. Comment.

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

State and prove Neymann Pearson fundamental lemma.

Describe the LR procedure for testing the equality of variances of two normal populations.

A random sample of 27 pairs of observations from a normal population gave a correlation coefficient of 0.6. Is this significant of correlation in the population?

Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins show the sample standard deviations of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal, against the alternative that they are not, at the 10% level. [Assume that $P(F_{10, 8} > 3.35) = 0.05$ and $P(F_{8, 10} > 3.07) = 0.05$].

Find if A and B are independent, positively associated or negatively associated, in each of the following cases:

- i) $N = 1000$, $(a) = 470$, $(B) = 620$, and $(AB) = 320$
- ii) $(A) = 490$, $(AB) = 294$, $(a) = 570$, and $(otB) = 380$.

Z-Z-Z

END