

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2018
(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 hypothesis.
- 2 What is type I error?
- 3 Define uniformly most powerful region.
- 4 What is power of the test?
- 5 What is tests of Significance?
- 6 Write the applications of student's 't' distribution.
- 7 Define chi-square distribution.
- 8 Write the formula for testing significance of equality of two variances.
- 9 What do you mean by independence of attributes?
- 10 What is the necessary and sufficient condition for the consistency of data?

SECTION - B (25 Marks)

Answer **ALL** Questions

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

- 11 a Explain the following :
(i) Null hypothesis (ii) critical region (iii) Level of significance.
OR
b State and prove Neyman pearson lemma.
- 12 a Given the frequency function:
$$f(x, \theta) = \begin{cases} \frac{1}{\theta}, & 0 < x < \theta \\ 0, & \text{elsewhere} \end{cases}$$
and that you are testing the null hypothesis $H_0 : \theta = 1$ against $H_1 : \theta = 2$, by means of single observed value of x . What would be the sizes of the type I and type II errors, if you choose the interval $0.5 < x$ as the critical region. Also obtain the power function of the test.
OR
b Prove that every most powerful (MP) critical region is necessarily unbiased.
- 13 a Briefly explain the concept of tests of significance.
OR
b A drug was administered to 10 patients, and the increments in their blood pressure were recorded to be 6, 3, -2, 4, -3, 4, 4, 6, 0, 3, 2 . Is it reasonable to believe that the drug has no effect on change of blood pressure? Use 5% level of significance level.
- 14 a Write a short note on student's 't' distribution and point out its uses.
OR
b State and prove the additive property of x - variate.
- 15 a Explain Yule's coefficient of colligation.
OR

Cont...

- 15 b Prepare a 2x2 table from the following information, calculate Yule's coefficient of Association and interpret the result.

$$N = 1500, (a) = 1117, (B) = 360, (AB) = 35.$$

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

- 16 Use the Neyman - Peason Lemma to obtain the region for testing $\theta = \theta_0$ against $\theta = \theta_j > \theta_0$ and $\theta = \theta_j < \theta_0$ in the case of a normal population $N(0, \sigma^2)$, where σ^2 is known.

- 17 Describe the likelihood ratio method for testing the equality of means of two normal populations.

- 18 A random sample of 10 boys had the following I.Q's : 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q. of 100.

- 19 Two random samples were drawn from two normal populations and their values are :

A: 66 67 75 76 82 84 88 90 92

B : . 64 66 74 78 82 85 87 92 93 95 97

Test whether the two populations have the same variance at 5% level of significance.

- 20 According to a survey the following results were obtained:

	Boys	Girls
No: of candidates appeared examination	800	200
Married	150	50
Married and successful	70	20
Unmarried and successful	550	110

Find the association between marital status and the success in the examination both for boys and girls.

Z-Z-Z

END