

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 a statistical hypothesis.
- 2 Define level of significance. -
- 3 Define most powerful test.
- 4 State likelihood function to test for equality of variances of two normal populations.
- 5 What are the errors in testing of hypothesis?
- 6 Write the t-test statistic for testing the difference between two means.
- 7 Define f-distribution.
- 8 State the additive property of chi square variates.
- 9 What is meant by dichotomous classification?
- 10 Define consistency of a set of class frequencies.

SECTION - B (25 Marks)

Answer ALL Questions

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

- 11 a If $x > 1$ is the critical region for testing $H_0 : \theta = 2$ against the alternative $H_1 : \theta = 1$, on the basis of the single observation from the population $f(x, \theta) = \theta \exp(-\theta x); 0 < x < a$. Obtain the values of type I and type II error.

OR

- b Explain the step by step procedure for testing a hypothesis.
- 12 a List out the properties of likelihood ratio test.

OR

- b Explain the L.R. procedure for testing the variance of normal population.'
- 13 a Explain paired t-test for difference of means.

OR

- b In a sample of 1,000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat eaters are equally popular in this state at 1% level of significance.
- 14 a List out the applications of chi-square distribution.

OR

- b In one sample of 8 observations, the sum of the squares deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it 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 $n_2 = 9$ d.f

15 a Explain the conditions for consistency of data.

OR

b Examine the consistency of the following data $N = 1,000$; $(A) = 600$; $(B) = 500$; $(AB) = 50$, the symbols their usual meaning.

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

16 State and prove Neyman Pearson Lemma.

17 Explain the L.R. procedure for testing the equality of means of two normal populations when population variance are unequal.

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 that of a population mean I.Q of 100?

19 It is believed that the precision (as measured by the variance) of an instrument is no more than 0.16. Write down the null and alternative hypothesis for testing this belief. Carryout the test at 1% level given 11 measurements of the same subject on the instrument. 2.5, 2.3, 2.4, 2.3, 2.5, 2.7, 2.5, 2.6, 2.7, 2.5.

20 ' Can vaccination be regarded as a preventive measure for small-pox from the data given below: -
“of 1482 persons in a locality exposed to small-pox, 368 in all were attacked”.
“of 1482 persons, 343 had been vaccinated and these only 35 were attacked”.

Z-Z-Z

END