

Section A: Objective Type Questions

Q1. Choose the appropriate Answer: (8x1.5=12)

- i. The degrees of freedom in a Chi-Square test for independence with a 3x4 contingency table are:
A 3 B 6
C 8 D 12
- ii. In a Chi-Square goodness-of-fit test, the expected frequency for each category should be:
A Less than 5 B Exactly 5
C At least 5 D More than 10
- iii. The degrees of freedom for a one-sample t-test with a sample size of 15 are
A 14 B 15
C 16 D 30
- iv. In a paired sample t-test, the data should:
A Be independent B Have equal variances
C Be paired observations D Be categorical
- v. The F-test is used to compare
A Means of two populations B Variances of two populations
C Medians of two populations D Distributions of two populations
- vi. In an F-test, the F-statistic is calculated by:
A Dividing the larger sample variance by the smaller sample variance B Dividing the smaller sample variance by the larger sample variance
C Multiplying the variances of the two samples D Subtracting the smaller variance from the larger variance

vii. Which one of the following test is non-Parametric test

- A Run test B T test
C F test D None of above

viii. Non-parametric tests are used when:

- A Data is normally distributed B Data is ordinal or nominal
C Variances of the populations are equal D Sample sizes are large

Section-B: Descriptive Type Questions (Short Type)

Q2: Answer all the Questions (8 x 4 =32)

- i. What are the applications of chi square test?
- ii. Define Chi Square test ?
- iii. What are the assumptions of Student's t- test
- iv. Describe the steps involved in conducting a one sample t-test.
- v. Define variance ratio test
- vi. Write some properties of F test or variance ratio test.
- vii. Define Run Test
- viii. Write a short note on Median test.

Section – C: Descriptive Type Questions (Medium Type)

Answer all the questions: (4 x 7=28)

Q3. What are the assumptions and conditions that must be satisfied to apply a Chi-Square test?

OR

Describe the steps involved in conducting a Chi-Square goodness-of-fit test

Q4. Write a short note on t test and point out its uses ?

OR

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 ? Test at 5 % significance level. ($t_{0.05}$ for 9 d.f. for two tail test is 2.262).

- Q5.** Describe the steps involved in conducting an F-test for equality of variances.

OR

What are the assumptions of the variance ratio test.

- Q6.** Write a short note on Mann-Whitney U- test.

OR

A sequence of Heads (H) and Tails (T) in tossing of a coin 16 times is given below:

H T T T H T H T H H T H T T H H.

Test whether the Heads and Tails occur in random order.

SECTION – D: DESCRIPTIVE TYPE QUESTIONS (Long Type)

Answer any two of the following:

(2 x 14=28)

- Q7.** Out of 8000 graduates in a town 800 are females, out of 1600 graduates employees 120 are females. Use χ^2 to determine if any distinction is made in appointment on the basis of sex . Value of χ^2 at 5% level of significance for one degree of freedom is 3.84
- Q8.** A certain stimulus administered to each of the 12 patients resulted in the following increase of blood pressure: 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4 and 6
Can it be concluded that the stimulus will, in general , be accompanied by an increase in blood pressure ? Value of t at 5 % significance level for 11 d.f. is 1.80.

- Q9.** In one sample of 8 observations, the sum of squares of the 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. is 3.29.

- Q10.** Data on value of imports of selected agricultural productions inputs by a country in million rupees during recent 12 years is given below. Is the sequence random?
5.2, 5.5, 3.8, 2.5, 8.3, 2.1, 1.7, 10.0, 6.9, 7.5, 10.6