AS–1436

**B.Sc. (Part–II) Semester–IV Examination**

**STATISTICS**

Time : Three Hours] [Maximum Marks : 80

**Note :–** **ALL** questions are compulsory.

1. (A) Fill in the blanks : 2

(1) The sampling distribution of students-t was discovered by _____.

(2) Base period must be a _____ period.

(3) Arrangement of data in chronological order is called _____.

(4) No. of letters in each runs is called _____ of runs.

(B) Choose the correct alternative (MCQ) : 2

(1) Range of students.t distribution is :

(a) 0 to n (b) 0 to 1

(c) 0 to $\infty$ (d) $-\infty$ to $\infty$

(2) No. of parameters in Bi-variate Normal distribution are :

(a) Two (b) Three

(c) Four (d) Five

(3) Geometric mean of Laspeyre's and Paasche's Index no. is a :

(a) Drobish-Bowley Index no.

(b) Marshall-Edgeworth Index no.

(c) Fisher Index no.

(d) Walsch Index no.

(4) Entire large sample theory is based on the application of :

(a) Binomial test (b) Chi-square test

(c) Normal test (d) None of these

(C) Answer the following in **one** sentence : 4

(1) Who proposed the test of consistency for ideal index number ?

(2) What is equilibrium price ?

(3) What do you mean by trend ?

(4) Give the definition of RUN.

2. (A) Define student.t statistics. Derive its pdf for $\nu$ degrees of freedom. 6

(B) Establish the relationship between student-t and snedecore's F statistics. 6

**OR**

3. (P) Define Snedecore's F-statistics with its p.d.f. and state various applications of F-test. 6

(Q) Explain F-test for testing equality of population variance. 6

4. (A) State central limit theorem with its uses. 4

(B) Describe large sample test for single sample proportion. 4

(C) Explain large sample test for difference of two sample means. 4

**OR**

5. (P) Define Fisher's Z-transformation. 4

(Q) Describe large sample test for single sample mean. 4

(R) Explain large sample test for difference of two sample proportions. 4

6. (A) Explain what is meant by non-parametric test and discuss the advantages and disadvantages of non-parametric test. 6

(B) Define run and explain the run test. Also obtain the distribution of runs when they are even and odd. 6

**OR**

7. (P) Define ordered statistics with an example and explain main difference between parametric and non-parametric test. 6

(Q) Explain the following tests :–

(1) Median test

(2) Kolmogrov-Smirnov one sample test. 6

8. (A) What do you mean by index number ? Explain it as economic barometers. 4

(B) Explain the criteria for the selection of base period in index number. 4

(C) Show that, Fisher ideal index number lies between Laspeyre's and Paasche's index number. 4

**OR**

9. (P) Describe cost of living index number and explain family budget method for constructing cost of living index number. 4

(Q) Explain factor reversal test and show that Fisher's formula satisfies factor reversal test. 4

(R) If L(p) and P(q) represents Laspeyre's and Paasche's index number for price and quantities, then show that :

$$L(p) \times p(q) = L(q) \times P(p)$$ 4

10. (A) Explain the concept of time series and state its application. 4

(B) What are different components of time series ? Explain any one of them in detail. 4

(C) Describe simple average method for measurement of seasonal variation in time series. 4

**OR**

11. (P) Describe the mathematical model in time series. 4

(Q) Explain "semi-average method" for the measurement of trend in time series. 4

(R) Explain ratio to moving average method for measurement of seasonal variation in time series. 4

12. (A) Discuss law of demand and supply. 4

(B) Explain Pareto's law of income-distribution. 4

(C) Explain price elasticity of demand. 4

**OR**

13. (P) Explain main sources of obtaining data required for estimating elasticities. 4

(Q) Define :–

(i) Necessities and Luxuries

(ii) Demand function. 4

(R) Explain cross elasticity of demand. 4