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

**4S : STATISTICS**

Time : Three Hours] [Maximum Marks : 80

**Note :—** All questions are compulsory.

1. (A) Fill in the blanks :— 2

(i) Base year quantity is used as weight in _____ price index.

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

(iii) Non-parametric methods are also called as _____ test.

(iv) _____ test is used for testing equality of population variances.

(B) Choose the correct alternatives (MCQ) :— 2

(i) F-Statistics was invented by :

(a) W.G. Cochran (b) G.W. Snedecor

(c) R.A. Fisher (d) W.S. Gosset

(ii) Range of Students t distribution is :

(a) 0 to 1 (b) $-\infty$ to $+\infty$

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

(iii) Which is not component of Time Series ?

(a) Trend (b) Social Trend

(c) Seasonal variation (d) Random Variation

(iv) Ideal Index number is :

(a) Dorbish–Bowley (b) Mashall–Edgeworth

(c) Fisher's Index No (d) Laspeyre's I.N.

(C) Answer in **ONE** sentence :— 4

(i) State the formula for Student's t-statistics.

(ii) Who proposed the test of consistency in ideal index number ?

(iii) Which test is based on ranks ?

(iv) What do you mean by trend ?

2. (A) Define Snedecor's F-Statistic and derive its p.d.f. 6

(B) State various applications of F-distribution. Explain F-test for testing equality of population variance. 6

**OR**

3. (P) Define Student's t-statistic. Derive its pdf for ν degrees of freedom. 6

(Q) Establish the relationship between Student's t and Snedecor's F Statistics. 6

4. (A) Define Fisher's z-transformation. 4

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

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

**OR**

5. (P) State Central Limit Theorem with its uses. 4

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

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

6. (A) Define ordered statistics with an example and state main difference between parametric and non-parametric test. 6

(B) Describe in detail Median Test with its merits and demerits. 6

**OR**

7. (P) Describe in detail non-parametric test and state merits and demerits of N-P test. 6

(Q) Explain run test and obtain the distribution of runs for odd no. of runs. 6

8. (A) What do you mean by cost of living index ? 4

(B) Show that Fisher's formula satisfies factor reversal test. 4

(C) Define :—

(i) Laspeyre's price index number

(ii) Paasche's quantity index number. 4

**OR**

9. (P) Explain Index Number as Economic Barometers. 4

(Q) Show that Fisher's Index Number lies between Laspeyre's and Paasche's index numbers. 4

(R) Describe the criteria for the selection of base period in index numbers. 4

10. (A) Define Time series and explain the additive model in time series. 4

(B) State different components of time series and explain any one of them in detail. 4

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

**OR**

11. (P) Describe both mathematical models in time series. 4

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

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

12. (A) Explain Law of Demand and Supply. 4

(B) Define :—

(i) Necessities and Luxuries

(ii) Price Elasticity of demand. 4

(C) Explain Pareto's Law of income-distribution. 4

**OR**

13. (P) Explain 'Equilibrium Price' in detail. 4

(Q) Explain Income elasticity of demand. 4

(R) Discuss cross elasticity of demand. 4