2024
B.A./B.Sc.
Fourth Semester
GENERIC ELECTIVE – 4
STATISTICS
Course Code: STG 4.11
(Applied Statistics)

Total Mark: 70   *Pass Mark: 28*
Time: 3 hours

Answer <u>five</u> questions, taking <u>one</u> from each unit.

UNIT–I

1. (a) Describe the nature of the components of a time series.   6
   (b) Write the method of curve fitting by principle of least squares.   4
   (c) "Multiplicative model is the most commonly used assumption, as compared to additive model, in time series analysis." Justify.   2
   (d) Determine the four year moving average for 3.9, 5.3, 7.3, 9.6, 12.9, 17.1, 23.2, and 30.9.   2

2. (a) Discuss the role of the method of moving average in time-series analysis.   4
   (b) What do you understand by seasonal variation in a time series? Name the different methods of seasonal variation.   4
   (c) Describe the method of fitting trend by $3\times2=6$
       (i) Logistic curve
       (ii) Exponential curve

UNIT–II

3. (a) What are the uses of index numbers?   4
   (b) Discuss time reversal test and the factor reversal test. $3+3=6$
   (c) If $L(p)$ and $P(p)$ represent respectively Laspeyres index number for prices and Paasche's index number for quantities. Show that

   $$\frac{L(p)}{L(q)} = \frac{P(p)}{P(q)}$$ 4

4. (a) Explain weighted aggregate method of index number. 3
   (b) Prove that Fisher's ideal number lies between Laspeyres and Paasche's index numbers. 4
   (c) Explain consumer price index numbers. Also, write the limitations of index numbers. 4+3=7

UNIT–III

5. (a) What do you understand by control charts in statistical quality control? 3
   (b) Explain the two causes of variations in quality. 6
   (c) How do you set the control limits for number of defects per unit (c-chart)? 5

6. (a) Write the application of statistical quality control. 4
   (b) Explain control chart for mean. 5
   (c) What are the control charts for attributes? Discuss control charts for number of defectives. 1+4=5

UNIT–IV

7. (a) Explain in detail the principal rates use in measuring mortality. Also give their relative merits and demerits. 7
   (b) Discuss the method of obtaining vital statistics. 4
   (c) Explain the direct method of standardisation. 3

8. (a) In what sense specific death rates is better than crude death rate? Explain. 4
   (b) Define mortality table or life table. What are the assumptions made in life table? 2+4=6
   (c) Briefly explain the construction of life table. 4

UNIT–V

9. (a) Discuss price elasticity of supply. 5
   (b) Explain the different types of data required for estimating elasticities. 4
   (c) Demand and supply functions for tea are given by:

$x_d = 120 - 2p + 5\dfrac{dp}{dt}$ Kg per week, $x_s = 3p - 30 + 50\dfrac{dp}{dt}$ Kg per

week, where p is price at time t. Find the time path of p for dynamic equilibrium if initial price is given to be Rs. 360 per kg.　　5

10. (a) The price elasticity of a demand curve $x = f(p)$ is of the form $(a–bp)$, where a and b are given constants. Find the demand curve.　　3

(b) Describe Pareto's law of income distribution.　　5

(c) Write a note on Engel's law and Engel curves.　　6

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