

2021
STATISTICS
[HONOURS]
Paper : VII

Full Marks : 80

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Attempt any **seven** questions from the following:

1×7=7

- a) Explain the concept of equilibrium price.
- b) What is stable population?
- c) State the major defect of CDR.
- d) Define force of mortality.
- e) What is difference between a complete and a abridged life table?
- f) What does a cost of living index number for a particular community mean?
- g) State the relation between real income and nominal income.

- h) What is meant by trend in a time series?
- i) What is correlogram?

2. Attempt any **six** questions from the following:

2×6=12

- a) Explain standardized death rate and state the basis for selecting a standard population?
- b) Define total fertility rate (TFR) and state its use.
- c) Prove that $\frac{dT_x}{dx} = -l_x$ in connection with complete life table.
- d) What are official statistics?
- e) Obtain the relation between Laspeyre's, Fisher's and Paasche's price index numbers.
- f) What are the main considerations behind selecting base period for constructing a price index number?
- g) Obtain r^{th} ($r > 1$) order auto-correlation in a auto-regressive model of order 1.
- h) What is meant by a competitive commodity? Suggest an admissible range of price elasticity of demand of such type of commodity.

3. Attempt any **three** questions from the following:

$$7 \times 3 = 21$$

- a) Define money value of the market for a commodity and also establish that it remains fixed over change of price for a unitary commodity.
- b) Describe the different components of a complete life table. Also give the procedure to estimate q_x in general.
- c) Explain GRR, and NRR with their relative merits and demerits. Also show that $GRR \geq NRR$.
- d) Explain base shifting and splicing of index numbers with their importance.
- e) Use method of three selected points to estimate the trend values assuming modified exponential trend curve.

4. Attempt any **four** questions from the following:

$$10 \times 4 = 40$$

- a) Explain the important features of logistic growth curve. Discuss Rhodes method of fitting such a curve to study the population growth.
- b) What is stationary population? Give a brief account of constructing an abridged life table.

- c) What are different divisions of NSSO? Briefly describe their main functionalities towards official statistics.
- d) Describe, with suitable examples, different tests to be satisfied by a good index number for price.
- e) What do you mean by seasonal variation. Give an example. Describe link relative method to estimate the indices of seasonal variation.
- f) i) Suppose the demand curve of a commodity is of the form:

$$x = \beta_0 + \beta_1 p_x + \beta_2 p_0 + \beta_3 y$$

where β_i 's are constants, p_x is price of commodity, p_0 is price of a related commodity and y is constant income. Obtain expressions for price and income elasticity of demand for the said commodity.

- ii) Based on a given data set discuss the method of estimating Engel curve of hyperbolic form after making necessary assumptions.