Bachelor of Science (B.Sc.) Semester—IV (C.B.S.) Examination

STATISTICS (Applied Statistics)

Paper—II

Time : Three Hours] [Maximum Marks : 50

Note :— All the **FIVE** questions are compulsory and carry equal marks.

1. (A) Explain Crude and Standardized Death Rates. How is Standardized Death Rate superior to Crude Death Rate ? Explain the Direct and Indirect methods of obtaining Standardized Death Rates. Discuss the relative merits and demerits of these death rates. 10

OR

(E) Describe the notations $\dot{\ell}_x$, d_x, p_x, q_x, L_x, T_x of a complete life table stating their inter-relationships. In usual notations, prove the following :

(i) $\dot{L}_x = \frac{1}{2}(\ell_x + \ell_{x-1})$

(ii) $\dot{T}_x = \frac{1}{2}\ell_x + \ell_{x+1} + \ell_{x+2} + \ldots$

(iii) $\dot{n}\,q_x = \frac{d_{x+n-1}}{\ell_x}$. 10

2. (A) Define C.B.R. and G.F.R. Discuss their relative merits and demerits.

(B) Define crude rate of natural increase and Pearl's Vital Index. Explain why the Vital Index does not give idea about trend of population growth.

(C) When is a population said to be stationary ? State the conditions under which such a population may be conceived.

(D) Define G.R.R. Interpret it. State its shortcomings. 2.5×4=10

OR

(E) Define G.R.R. State the underlying assumptions in its construction. Derive the formula for G.R.R. in case of unavailability of genderwise classification of births. Discuss the merits and limitations of G.R.R. Define N.R.R. Explain how N.R.R. is an improvement over G.R.R. Interpret the cases N.R.R. = 1, N.R.R. < 1, N.R.R. > 1. What are the drawbacks of N.R.R. ? 10

3. (A) What is the need of scaling of raw scores in the tests ? Explain the procedure of calculating the following scores stating the assumptions to be made for their calculations :
   (i) Z scores and Standard scores
   (ii) Normalised scores and T-scores.
   Compare Standard Scores and T-scores. 10

OR

   (E) Explain the scaling of individual test items in terms of order of difficulty.
   (F) Explain the procedure of scaling of ranking in terms of Normal probability curve.
   (G) Distinguish between Standard scores and T-scores.
   (H) Define percentile score. State its uses. 2.5×4=10

4. (A) Define reliability of a test. Discuss the following methods of estimating test reliability stating their relative merits and demerits :
   (i) Parallel test method
   (ii) Test-Retest method
   (iii) Split-half method. 10

OR

   (E) Show that the intercorrelations of raw scores of three parallel tests are equal.
   (F) Define reliability of test scores and index of reliability.
   (G) Distinguish between predictive validity and concurrent validity.
   (H) Obtain an expression for the reliability of the lengthened test whose length is K times the length of the original test. 2.5×4=10

5. Solve any **TEN** of the following questions :
   (A) Define cause of Death Rate.
   (B) Define Curtale expectation of life.
   (C) State any two uses of a life table.
   (D) Is G.F.R. a probability rate ? Justify your answer.
   (E) What is meant by stable population ?
   (F) State the relationship between G.R.R. and N.R.R. Explain why is it so.
   (G) Why is Psychological scale an interval scale ?
   (H) Define difficulty value of a test item.
   (I) Define the terms ‘Mental age’ and ‘Intelligence Quotient’.
   (J) Define equivalent scores.
   (K) Validity is a highly relative concept. Explain.
   (L) What are intelligence tests ? State their purpose. 1×10=10