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

STATISTICS (Applied Statistics)

Optional Paper—II

Time : Three Hours] [Maximum Marks : 50

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

1. (A) Explain the following mortality rates stating their uses, merits and demerits :

    (i) Infant Mortality rate.

    (ii) Causes of death rate.

    (iii) Case Fatality rate. 10

OR

   (E) Explain the following terms in a complete life table :

    l_x, d_x, p_x, q_x, L_x, T_x, e_x, e_x^o

    Obtain their interrelationships. Hence explain the construction of these 8 columns of life table.

    10

2. (A) Distinguish between stable and stationary population.

   (B) Distinguish between C.B.R. and G.F.R.

   (C) Explain how T.F.R. overcomes the limitations of C.B.R. and G.F.R.

   (D) Define Crude Rate of Natural Increase and Pearle's Vital Index. Explain their uses and limitations.

    $2.5 \times 4 = 10$

OR

   (E) Explain the construction of following rates stating assumptions, definition, merits and demerits :

    (i) Age Specific Fertility Rate

    (ii) Total Fertility Rate.

    (iii) Gross Reproduction Rate.

    (iv) Net Reproduction Rate. 10

3. (A) Define Percentile scores and T-Scores. Explain how these scores are computed for a given frequency distribution of raw scores. State advantages and disadvantages of these scores, stating the underlying assumptions involved in their construction. 10

OR

   (E) Explain z-scores and standard scores. Show that mean and variance of z-scores are 0 and 1 respectively. State the merits and demerits of these scores.

   (F) Explain the procedure of scaling of individual test items in terms of difficulty. 5+5

4. (A) Define the terms reliability and validity of a Psychological test. How is the validity of a test obtained experimentally ? Compare reliability and validity. Derive an expression for validity of a test whose length is increased k times. 10

OR

(E) Explain the method of rational equivalence for estimating the test reliability. Derive Kuder-Richardson's Formula-20.

(F) Define parallel tests. Obtain the conditions for two tests to be parallel to each other. Explain parallel forms method for estimating test reliability stating its merits and demerits. 5+5

5. Solve any **TEN** of the following qustions :—

(A) Distinguish between C.D.R. and S.D.R.

(B) Define sex ratio.

(C) Which column of the life table is called 'Pivot' column ?

(D) Why is C.B.R. not a probability rate ?

(E) Show that G.R.R. is the upper limit of N.R.R.

(F) Define age-S.F.R. based on female births.

(G) Define a difficulty value of a test item.

(H) What is meant by equivalent scores ?

(I) Define a normalized score.

(J) Define an index of reliability.

(K) Distinguish between predicitive and con-current validity.

(L) 'To be valid a test must be reliable'. Justify the statement. 1×10=10