NRJ/KW/17/3122

Bachelor of Science (B.Sc.) Semester—IV (C.B.S.) Examination
STATISTICS (Applied Statistics)
Paper—II

Time : Three Hours]   [Maximum Marks : 50

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

1. (A) Describe the following mortality rates by explaining their comparative merits and demerits :
    (i)   C.D.R.
    (ii) Specific Death Rate
    (iii) S.T.D.R.
    Explain the indirect method of standardization stating its need.   10

OR

   (E) In usual notations, show that :

    (i) $nq_x = \dfrac{d_{x+n-1}}{\ell_x}$

    (ii) $e_x = \displaystyle\sum_{n=1}^{\infty} \dfrac{\ell_{x+n}}{\ell_x}$

    (iii) $\mu_{x+\frac{1}{2}} = m_x$.   10

2. (A) Explain the construction of the following fertility rates by stating their definition, relative merits and demerits :
    (i)   Crude Birth Rate
    (ii) General Fertility Rate
    (iii) Specific Fertility Rate
    (iv) Total Fertility Rate.   10

OR

   (E) Write a note on stable and stationary population. State the conditions under which stable population becomes stationary.

   (F) Define G.R.R. and N.R.R. Explain how N.R.R. is an improvement over G.R.R. as a rate of population growth. Also interpret N.R.R.   5+5

3. (A) Explain the following scaling procedures stating the objective, assumptions and methodology :
    (i)   Scaling individual test items in terms of difficulty
    (ii) Scaling of ranking in terms of normal curve
    (iii) Scaling of ratings in terms of normal probability curve.   10

OR

   (E) Define the following scores stating the underlying assumptions :
    (i)   Z-Score and Standard Score
    (ii) Normalized Score and T-Score.
    Describe the procedure of calculating T-Scores for a given frequency distribution of raw scores. Compare T-Scores and Standard Scores. State the uses of T-Scores.   10

4. (A) Explain the following 4 concepts of validity stating their uses

    (i) Predictive Validity

    (ii) Concurrent Validity

    (iii) Content Validity

    (iv) Construct Validity.   10

<div align="center">**OR**</div>

(E) Define reliability of a Psychological test. Explain the following three methods of estimating reliability stating their relative merits and demerits :

    (i) Test-Retest Method

    (ii) Parallel Forms Method

    (iii) Split-Half Method.   10

5. Solve any **TEN** of the following questions :

(A) Which mortality rate has a multiplier 1,00,000 instead of 1,000 ? Why ?

(B) State different sources of collection of vital statistical data.

(C) Define rate of a vital event.

(D) Define Pearle's Vital Index. State its use.

(E) If G.R.R. = N.R.R. then interpret the situation.

(F) State the formula for G.R.R. based on sex ratio.

(G) Why is the Psychological scale an interval scale ?

(H) Define percentile score.

(I) Show that the mean and variance of a set of Z-Scores are zero and one respectively.

(J) Define Mental Ratio & I.Q.

(K) What is the purpose of intelligence tests ?

(L) Define a linear model in modern test theory explaining the terms involved in it. $1 \times 10 = 10$