Bachelor of Arts (B.A.) Part—II (Fourth Semester) Examination

STATISTICS (Applied Statistics)

Optional Paper—2

Time : Three Hours] [Maximum Marks : 50

N.B. :— ALL questions are compulsory and carry equal marks.

1. (a) Define C.D.R. and S.T.D.R. with their relative merits and demerits. Also define Infant Mortality Rate (I.M.R.).

   (b) Describe the following columns of a complete life table stating their inter relationships. l_x, d_x, p_x, q_x, L_x, and T_x. 5+5

OR

   (e) Explain the direct and indirect methods of standardization. Define cause of death rate.

   (f) Define :

   (1) Curtate expectation of life.

   (2) Complete expectation of life at the age x.

   Show that in the usual notations :

   (1) $np_x = p_x . p_{x+1}$ -------- p_{x+n-1}

   (2) $e_x = \frac{\left(\sum_{n=1}^{\infty} l_{x+n}\right)}{l_x}$. 5+5

2. (a) Explain the concept of stable population. State the conditions under which stable population becomes stationary.

   (b) Define Age — S.F.R. with its merits and demerits.

   (c) Define crude rate of natural increase and Pearle's vital Index. State their uses and limitations.

   (d) Define G.R.R. and N.R.R. Explain how N.R.R. is an improvement over G.R.R. 2½×4=10

OR

   (e) Discuss the following fertility rates with their relative merits and demerits :

   (i) Crude Birth Rate

   (ii) General Fertility Rate

   (iii) Total Fertility Rate. 10

3. (a) Describe the construction of following scores and compare them :

   (i) Standard score

   (ii) Normalised score

   (iii) T-score

   (iv) Percentile score. 10

OR

(e) Show that mean of a set of sigma scores is always zero and its standard deviation is 1.

(f) Distinguish between standard scores and T-scores.

(g) Explain the procedure for computing percentile scores for a given frequency distribution of raw scores. State the uses of percentile scores.

(h) Explain the procedure for conversion of ratings A,B,C, with frequencies f_1, f_2, f_3 given by a judge to N individuals into scale values and corresponding numerical scores. 2½×4=10

4. (a) Define validity of a test. How is it estimated ? Derive an expression for validity of a test. Whose length is increased K times but the criterion variable is not lengthened. Distinguish between predictive validity and concurrent validity. 10

OR

(e) Obtain the conditions for two tests to be parallel to each other.

(f) When is a given test said to be valid ? What is meant by content validity ?

(g) Explain the split-half method of estimating test reliability stating its merits and demerits.

(h) Obtain an expression for the reliability coefficient of a lengthened test whose length is increased K times. 2½×4=10

5. Solve the following questions (any **ten**) :

(a) Define case fatality rate. What is its purpose ?

(b) State the different sources of demographic data.

(c) Which column of the life table is called as pivotal column ? Why ?

(d) Pearle's vital index is a crude measure of population growth why ?

(e) State any two uses of vital statistics.

(f) When will N.R.R. be equal to G.R.R. ?

(g) Define difficulty value of an item in an educational test.

(h) State the relation between normalized score and T-score.

(i) What is the drawback of percentile score ?

(j) State one difference between reliability and validity of a psychological test.

(k) Show that index of reliability is always greater than reliability coefficient.

(l) Define the term 'Mental Ratio' and interpret the cases :

(i) M.R. > 1

(ii) M.R. < 1

(iii) M.R. = 1. 1×10=10