B.Sc. (Honours) Examination, 2021
Semester-V
Statistics
Course: DSE-2 (Demography and Vital Statistics (Theory))
Full Marks: 40   Time: 3 Hours

(Answer any _four_ questions.)

1. (a) Describe Chandrasekharan-Deming's procedure of estimating the total number of vital events.
   (b) Define Whipple's index. Describe Myres' method for avoiding the bias in the indices computed in the way.

   $$4+(2+4)=10$$

2. (a) Distinguish between
      i. stable population and stationary population
      ii. morbidity incidence rate and morbidity prevalence rate.
   (b) Interpret the statement: "GRR $= 1.5$ for a country.".

   $$(4+4)+2=10$$

3. (a) Mention different types of errors found in vital statistics data obtained from census.
   (b) Distinguish between population estimate and population projection. What is the difference between inter-censal and post-censal estimates? Describe the mathematical method for obtaining the inter-censal and post censal estimate.

   $$3+(2+2+3)=10$$

4. (a) What are the drawbacks of crude death rate? How does the standardized death rate overcome these drawbacks?
   (b) Elaborately distinguish between direct and indirect method of standardization.

   $$(2+2)+6=10$$

5. (a) Starting from a suitable assumption, derive the expression of the logistic curve and illustrate its properties.
   (b) Explain any one of the methods for the fitting of a logistic curve.

   $$5+5=10$$

6. (a) Define force of mortality at age x. Suppose you are given that $\dfrac{1}{\mu_x} = (a_0 + a_1 x)(b_0 + b_1 x)$, where μ_x stands for the force of mortality. Find an expression for l_x.
   (b) Prove that $\mu_x = \dfrac{1}{e_x^{\;0}}\left(1 + \dfrac{d}{dx}e_x^{\;0}\right)$
   (c) What do you mean by balancing equation?

   $$4+4+2=10$$