

U.G. 3rd Semester Examination - 2021

STATISTICS

[HONOURS]

Course Code : STAT-H-CC-T-6

(Vital Statistics and Demography)

Full Marks : 50 (40+10)

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.**Notations and symbols have their usual meaning.*1. Answer any **five** questions: $2 \times 5 = 10$

- Define Age Specific Death Rate.
- Distinguish between Stable Population and Stationary Population.
- Why is Infant Mortality Rate not a probability rate?
- Distinguish between population projection and population estimation.
- Define Net Reproduction Rate.

- Describe the reason for which logistic curve will not give a good fit .
- Distinguish between Neonatal and Perinatal Mortality Rate.
- In usual notation show that

$$e_x = \sum_{n=1}^{\infty} \frac{lx+n}{lx}.$$

2. Answer any **two** questions: $5 \times 2 = 10$

- Why do you use Standardized Death Rate? Explain both direct and indirect method of standardization.
- Describe errors in Census Data.
- For a complete life table prove that

$$\frac{m_x}{1+m_x} < q_x < m_x \frac{q_x}{1-q_x}.$$

- Show that CDR for a life table stationary population, except for the multiplier 1000, is equal to $\frac{1}{e_0^0}$.

3. Answer any **two** questions: $10 \times 2 = 20$

- Distinguish between TFR and GRR. Find an approximate relation between TFR and GRR

clearly stating the underlying assumptions. For a country the sex ratio at birth may be taken as 105 males to 100 females. If for a given year TFR is 3.54 then what will be the estimated value of GRR? 4+3+3

- b) What is relative growth rate? What will be the functional forms of the growth (P) if we assume that the relative growth rate is constant and also changing with time? What are the properties of logistic growth curve? 2+5+3
- c) Why is the q_x column of a complete life table called the "Pivotal column"? Show that under suitable assumptions (to be stated) q_x may be estimated from Age Specific Death Rate m_x by the approximate formula $q_x = \frac{2m_x}{2+m_x}$. Is the assumption is suitable for $x = 0$? 2+5+3
- d) What do you mean by population growth? Define some measures of population growth. How does NRR overcome the drawbacks of GRR? 2+5+3

[Internal Assessment: 10]
