

U.G. 3rd Semester Examination - 2020**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: $2 \times 5 = 10$

- Mention two sources of data for Demography.
- Define Crude Rate of Natural Increase and Vital Index.
- Why is Crude Birth Rate not a probability rate?
- What are the important properties of a Logistic curve?

- Explain the nature of growth when $NRR=1$.
- For a complete life table derive that $p_x = e_x / (1 + e_{x+1})$.
- Define Age Specific Death Rate for male.
- Distinguish between rates and ratio.

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

- Discuss about the limitations of Crude Death Rates as a measure of mortality in order to compare mortality situation of two different places. Also state a good measure which can be used for such comparison.
- Define Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR). Show that for any community $NRR < GRR$.
- Define General Fertility Rate (GFR). What are the limitations of GFR? Describe the implication of the statement "GFR of a country is 125.2 in the year 2018".
- Show that: $(e_x e_{x+1} e_{x+2} \dots e_{x+n-1}) / [(1 + e_{x+1})(1 + e_{x+2}) \dots (1 + e_{x+n})] = {}_n p_x$.

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

- a) Describe different errors in Census data and Registration data. What are the different vital events in human life and how are the data related to these vital events collected?
- b) Define different functions of a Complete Life Table. Explain how the different columns of a complete life table can be computed on the basis of the observed age-specific fertility rates.
- c) What is meant by μ_x , the force of mortality at age x ? Derive Makeham's formula starting from suitable assumptions. Also describe a method of fitting this formula.
- d) Starting from suitable assumptions regarding relative growth rate of the population derive the equation of the logistic curve. Also describe Rhodes' method for fitting a logistic curve to the population data.

[Internal Assessment: 10]
