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- (a) Discuss following terms in detail
- (i) Vital Events (ii) Vital statistics Registers
 (iii) Adhoc Demographic Surveys (iv) Usefulness and shortcomings of Vital statistics
- (b) Define 'Population Growth'. Discuss Measures of Population Growth

OR

- 1 (a) Discuss Basic Measures for Demographic Analyses.
 Explain importance of Quality of Data
- (b) Discuss Population Growth models under Random environment.

- 2 (a) Discuss general structure of complete Life tables.
 Describe the elements and state their inter-relationship

- (b) Define 'stable Population'. Compare it with 'stationary Population'. Discuss the importance of 'stable Population'.

OR

- 2 (a) Explain the terms :

(i) Force of mortality (ii) Central Mortality Rate

- (b) In usual notations show that

$$(i) M(x + \frac{1}{2}) = m(x)$$

$$(ii) \frac{d e^{\int \mu(x) dx}}{dx} = M(x) e^{\int \mu(x) dx} - 1$$

2 (c) Prove the Inequalities :

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$$(i) q(x) < m(x) < \frac{q(x)}{1-q(x)}$$

$$(ii) \frac{m(x)}{1+m(x)} < q(x) < m(x)$$

3 (a) Explain the general structure of Abridged Life Table. Compare it with Complete Life Table.

(b) Describe various methods for constructing Abridged Life Table.

OR

3 (a) Explain some demographic applications of Kendall's Birth And Death Process.

(b) Fit a logistic curve to the following census data by Rhode's method

Year	Population (in million)	Year	Population (in million)
1891	10.616	1951	62.886
1901	14.840	1961	77.116
1911	19.276	1971	100.312
1921	25.732	1981	125.896
1931	34.183	1991	151.990
1941	46.384	2001	182.944
		2011	217.029

4 (a) Discuss various Indices of Fertility in detail.

(b) Establish relationship between Crude Birth Rate, General Fertility Rate and Total Fertility Rate

(c) Find the standardised death rate by direct and indirect methods for the following data and write conclusion.

Age Group (in yrs.)	Standard Population		Population A	
	Population	Specific Death Rate	Population	Specific Death Rate
0-5	8,000	50	12,000	48
5-15	10,000	15	13,000	14
15-50	27,000	10	35,000	09
50 And Above	5,000	60	10,000	59

OR

4 (a) Discuss in detail applications of stochastic models on Fertility and Human Reproductive Process.

(b) Explain the term 'Migration'.

Discuss Immigration - Emigration process in the Theory of Migration.

5 (a) state whether the following ~~statements~~ ^{statements} are True or False. If False, correct it.

- (i) Vital statistics rates are generally expressed as fraction of population.
- (ii) Infant Mortality Rate is computed for children above 5 years age.
- (iii) The death rate obtained for a segment of a population is known as Crude Death Rate.
- (iv) General fertility rates mainly depend on Total Female Population.
- (v) A population maintaining constant growth rate is said to be a mobile population.
- (b) Make correct choices.

(i) In life table l_{x+n} is equal to:

(a) $l_x + n b_x$ (b) $l_x - n b_x$ (c) $l_x \cdot n p_x$ (d) $\frac{l_x}{n p_x}$

(ii) In Central Mortality Rate m_x in terms of

q_x is given by

(a) $m_x = \frac{2q_x}{2+q_x}$ (b) $m_x = \frac{2q_x}{2-q_x}$ (c) $m_x = \frac{q_x}{2+q_x}$ (d) $m_x = \frac{q_x}{2-q_x}$

(iii) In general in usual notations

(a) $GRR = NRR$ (b) $GRR < NRR$ (c) $GRR > NRR$

(d) none of these.

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5 (b)

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(iv) In general $NRR=1$ implies:

(a) Female Population will exactly replace itself

(b) Population remains constant

(c) There is no mortality in female births.

(d) All the above.

(c) write short notes on: (any two)

(i) Census-2011

(ii) Population Projection

(iii) Importance of Vital Statistics in India

(iv) Fertility and Mortality

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