

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch - STATISTICS

MAJOR ELECTIVE COURSE I : DEMOGRAPHIC TECHNIQUES

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The term "Demography" was first used by (a) Guillard (b) Hauser (c) Lotka (d) Dandekar	K1	CO1
	2	Main components of population change are (a) marriage, birth, divorce (b) birth, death, migration (c) fertility, morbidity, ageing (d) Income, education, occupation	K2	CO1
2	3	The probability of death between ages x and x+1 is represented by (a) d_x (b) L_x (c) q_x (d) T_x	K1	CO2
	4	Makeham's law adds a constant term to (a) Binomial distribution (b) Gompertz law of mortality (c) Poisson model of fertility (d) Leslie matrix	K2	CO2
3	5	General Fertility Rate considers only (a) total population (b) all births including still- births (c) married couples (d) women aged 15–49	K1	CO3
	6	The formula $\frac{B^t}{P^t} \times 1000$ represents (a) crude birth rate (b) crude death rate (c) fertility ratio (d) morbidity rate	K2	CO3
4	7	The demographic phenomenon involving population movement is primarily known as (a) mortality (b) fertility (c) migration (d) marriage	K1	CO4
	8	A person moving from one migration-defining area to another during a given interval is called a (a) commuter (b) migrant (c) tourist (d) refugee	K2	CO4
5	9	A birth-death process is an example of (a) deterministic model (b) linear programming (c) stochastic process (d) life table function	K1	CO5
	10	Extinction probability refers to the chance that (a) population grows without bound (b) population eventually reaches zero (c) fertility exceeds mortality (d) migration rate is constant	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks $(5 \times 7 = 35)$

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define demography and describe its scope.	K1	CO1
		(OR)		
	11.b.	How do you explain the idea of demographic transition theory?		
2	12.a.	Differentiate between Makeham and Gompertz models of mortality.	K2	CO2
		(OR)		
	12.b.	Explain the main functions of a complete life table.		
3	13.a.	Define natality and outline its main characteristics.	K2	CO3
		(OR)		
	13.b.	Differentiate between birth and death rates.		
4	14.a.	Define migration and describe major types.	K1	CO4
		(OR)		
	14.b.	Identify key socio-economic factors affecting migration.		
5	15.a.	Define a birth-death process and its key parameters.	K2	CO5
		(OR)		
	15.b.	Explain the assumptions underlying stochastic demographic models.		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO																														
1	16	Discuss mortality concepts and its types.	K4	CO1																														
2	17	Complete the life table of the population of a certain types of insects, x being the age in days and $l_x = 1000$ for $x=0$.	K3	CO2																														
		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr> <td>q_x</td><td>0.1</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.1</td><td>0.5</td><td>0.8</td><td>0.9</td><td>0.9</td></tr> <tr> <td>20</td><td>05</td><td>10</td><td>50</td><td>00</td><td>00</td><td>00</td><td>00</td><td>00</td><td>50</td></tr> </table>	x	0	1	2	3	4	5	6	7	8	q_x	0.1	0.0	0.0	0.0	0.1	0.5	0.8	0.9	0.9	20	05	10	50	00	00	00	00	00	50		
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q_x	0.1	0.0	0.0	0.0	0.1	0.5	0.8	0.9	0.9																									
20	05	10	50	00	00	00	00	00	50																									
3	18	Discuss various indices of fertility measures and their applications.	K2	CO3																														
4	19	Could you describe the direct and indirect methods used to measure internal migration, and evaluate their strengths and limitations?	K5	CO4																														
5	20	Derive the solution for a simple birth-death differential equation and interpret the demographic meaning.	K3	CO5																														