



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2021/ 2022 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

**SCHOOL OF PURE, APPLIED AND HEALTH
SCIENCES.**

**DEGREE IN APPLIED STATISTICS WITH
COMPUTING.**

COURSE CODE: STA 4137

COURSE TITLE: STATISTICAL DEMOGRAPHY

DATE: 8TH APRIL, 2022

TIME: 1100-1300

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO questions

This paper consists of FOUR printed pages. Please turn over.

QUESTION ONE (30MARKS)

- a) Distinguish between the following terms as used in demography: (4marks)
(i) Nuptiality and mortality
(ii) Crude death rate and age specific death rate
- b) Discuss four sources of demographic data (4marks)
- c) State three statistical properties of life table estimators. (3marks)
- d) Distinguish between De Facto Enumeration and De Jure Enumeration (2marks)
- e) State and explain the two types of life tables (3marks)
- f) Given the parity and number of women with at least i children in France 1963:

PARITY (x)	NUMBER OF WOMEN WITH x CHILDREN.	NUMBER OF WOMEN WITH AT LEAST i CHILDREN
0	192 509	1 101 681
1	279 338	907 785
2	255 318	626 372
3	157 082	369 559
4	85 245	217 301
5	48 617	131 467
6	30 794	82 561
7	18 746	51 601
8	12 145	32 767
9	20 500	20 578

- (i) Calculate parity progression rate
(ii) Taking a radix of 1000 women calculate average family size (6marks)
- g) The following figures were given as the mortality rates q_x of a certain life table at the ages 0, 1, 2, 3, 4, 5, for the year 1935.
0.2487, 0.0918, 0.0564, 0.0392, 0.0274, and 0.0193
- Taking the starting l_x as 10,000 calculate the values of l_x , d_x , p_x , and L_x for the various ages and display your values in the relevant table. (5marks)
- h) Give three reasons why infant mortality is a problem that requires special attention. (3marks)

QUESTION TWO (20MARKS)

- a) Discuss the five principles of demographic sample surveys. (5marks)
- b) Describe seven probability sample survey designs a demographer can use to carry out a sample survey in a given population. (7marks)
- c) If in 1960 and 2009, the world population was 3.0402 and 6.8158 billion respectively.

- i. Obtain exponential model of population growth. (5marks)
- ii. Use (i) above to project the world population in 2030 (3marks)

QUESTION THREE (20 MARKS)

- a. Give two uses of life tables. (2marks)
- b. The values of ${}_5q_x$ for females in a certain developing country are given below:

${}_5q_x$.25004	.02994	0.02382	.03183	.04009	.04512	.05100	.05651
AGE	0	5	10	15	20	25	30	35

- c. Construct abridged life table with radix 100,000 and with values of l_x taken to the nearest unit of females based on the above values of ${}_5q_x$. The table should indicate l_x , ${}_5d_x$, ${}_5L_x$, T_x and ${}_5M_x$ (6marks)
- d. Use the table to calculate the probability that:
 - i. A female aged zero will live to age five years (2marks)
 - ii. A female aged ten will die after thirty years (2marks)
 - iii. A female aged ten will die between 20 and 30 years (2marks)
 - iv. Two females aged 15 will both die within ten years (2marks)
- e. Out of 900 females now aged 15 exactly how many might be expected to die between their 25th and 30th birthdays. (4marks)

QUESTION FOUR (20 MARKS)

- a) The following data gives the number of women in child bearing ages and yearly births by quinquennial age groups for a city.

Age group	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Female pop. In ('000)	16	15	14	13	12	11	9
Births	400	1710	2100	1430	960	330	36

Calculate:

- i. The general fertility rate. (2marks)
 - ii. The total fertility rate. (2marks)
 - iii. If the ratio of male to female children is 13:12, what is the gross reproduction rate? (2marks)
- b) In the following table, compute the standardized death rate by
- (i) Direct method
 - (ii) Indirect method (8mks)

Age	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	15,000	9
50+	5,000	60	10,000	59

c) Describe two factors that affect mortality rate (2marks)

d) Describe two methods of determining standard death rates. (4marks)

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