

UNIVERSITY OF SWAZILAND

FIRST SEMESTER EXAMINATION

ACADEMIC YEAR: 2017/18

TITLE OF PAPER: DEMOGRAPHIC METHODS I

COURSE NUMBER: DEM 211

TIME ALLOWED: 2 HOURS

INSTRUCTIONS: ANSWER ALL QUESTIONS IN SECTION A AND ANY TWO FROM SECTION B. ALL QUESTIONS ARE WORTH 30 MARKS EACH.

REQUIREMENTS: CALCULATOR

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GIVEN BY THE INVIGILATOR

SECTION A (COMPULSORY)

Question 1

- a) What is the difference between the total fertility rate and the gross reproduction rate? (2)
- b) The data below relates to Malawi. They come from a large sample survey of the population which took place in 1992. You are also told that the number of urban women in the survey is 1334 and the total number of rural women is 10 518. Using the data below, compute the following:
- General fertility rates for rural and urban areas (4)
 - Total fertility rates for rural and urban areas (4)
 - What do the results tell you about fertility in Malawi? (1)

Table 1: Proportion of women in rural and urban areas of Malawi and ASFR per woman by age, 1992

Age	Percentage of all women in age group		ASFR per woman	
	Urban areas	Rural areas	Urban areas	Rural areas
15-19	9.7	9.4	0.135	0.165
20-24	10.1	7.8	0.268	0.291
25-29	9.0	6.3	0.242	0.273
30-34	6.3	5.3	0.210	0.261
35-39	4.7	4.4	0.149	0.202
40-44	3.0	4.4	0.086	0.123
45-49	1.9	3.1	0.012	0.062

- b) Generally, there are 3 major reasons why people die. Discuss. (15)
- c) Use the data below to calculate crude incidence and prevalence rates per 100 000 population : (4)
- Total estimated population: 452 780
Total cases of AIDS: 850
Total new cases of AIDS: 95
Total deaths from AIDS: 595

SECTION B (ANSWER ANY TWO QUESTIONS)

Question 2

- a) What is standardization? Why is it necessary to standardize rates? (4)
- b) What is the purpose of decomposing rates? (2)
- c) The data below shows the population in England and Wales, Scotland and Northern Ireland in 1981. The number of deaths in England and Wales are shown. The total

number of deaths in Scotland and Northern Ireland in 1981 was 63800 and 16300 respectively.

- I. Calculate the crude death rates in England and Wales, Scotland and Northern Ireland in 1981. (6)
- II. Compare the mortality experiences of the three populations using standardized indices. (16)
- III. Comment on your results. (2marks)

Table 2: Population (in thousands) and Deaths by age

Age group	England and Wales		Scotland	Northern Ireland
	Population	Deaths	Population	Population
0-4	3006	8200	317	131
5-24	14958	6280	1655	552
25-44	13082	14730	1326	375
45-64	11040	101500	1140	296
65-74	4619	155000	459	116
75-84	2388	190400	232	56
85+	541	102400	49	13

Question 3

- a) A certain population has the following parity progression ratios:

$$P_1 = 0.862$$

$$P_2 = 0.804$$

$$P_3 = 0.555$$

$$P_4 = 0.518$$

Assuming that no woman in this birth cohort had a fifth child, out of 1 000 women calculate:

- i) the number of women who remain childless (2)
 - ii) the number of women who have exactly one child? (3)
 - iii) the total fertility rate (3)
- b) Distinguish between complete and abridged life tables. (2)
- c) Complete the following life table, showing clearly the notation and formulae used. (10)

Table 3: Abridged life table for country X

Age	nq_x	l_x	${}_n d_x$	nL_x	T_x	e_x
0-1	0.03168	100000	(ii)	97782	6997475	69.97
1-4	0.00793	96832	768	385793	(iv)	(v)
5-9	0.00344	960064	331	(iii)	6513900	67.81
10-14	0.00280	(i)	268	477998	6034406	63.03
15-19	0.00444	95466	424	476269		58.20
20-24	0.00613	95042	583	473752	5080139	53.45
25-29	0.00747	94459	706	470531	4606386	48.77
30-34	0.00911	93753	854	466632	4135855	44.11

- d) Use this life table to answer the following questions:
- What is the probability of survival between exact age 10 and 30 given survival to age 10? (2)
 - What is the probability of surviving from birth to age 25? (2)
 - What is the probability of dying between exact ages 15 and 20 given survival to age 15? (2)
- e) Conceive of the life table as a stationary population in which nL_x is the number of persons alive between ages x and $x+n$.
- What is the proportion of those aged 20-24 in the stationary population? (1)
 - What is the death rate? (1)
- f) In a certain country, the life expectancy at birth in 2007 was 77 years. Provide an explanation of what this means in terms understandable by non-demographers. (2)

Question 4

- a) Using the data in Table 4 below, compute the mean age at marriage for males and females and give an interpretation of the results. (10)

Table 4: Number of people marrying for the first time by age and sex, England, 1991

Age	Males	Females
15-19	4 630	17 704
20-24	74 378	103 689
25-29	91 675	72 523
30-34	34 560	21 000
35-39	10 252	5 785
40-44	3 998	2 075
45-49	1 520	911

- b) Provide the formula for calculating the Singulate Mean Age at Marriage (SMAM), clearly defining each of the components of the formula. (8)
- c) What is meant by population projection? (2)
- d) Using the data in Table 5, calculate the number of births born to women aged 15-49 that survive to be aged 0-4 in 1986. (10)

Table 5: Indian Female Population by Age and ASFR

Age group	Population 1981	Population 1986	ASFR
15-19	33 163 600	38 882 496	0.0436
20-24	28 482 300	32 498 670	0.1242
25-29	25 072 700	27 787 902	0.1127
30-34	21 734 600	24 377 183	0.0795
35-39	18 950 900	21 050 612	0.0468
40-44	16 452 800	18 271 889	0.0236
45-49	13 960 400	15 762 934	0.0115

Additional Information: Survivorship ratio is 0.88827