UNIVERSITY OF SWAZILAND

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

MAIN EXAMINATION 2016

TITTLE OF PAPER: DEMOGRAPHIC METHODS 1

COURSE NUMBER: DEM 201

TIME ALLOWED: 2 Hours

INSTRUCTIONS: ANSWER QUESTION 1 AND ANY TWO QUESTIONS

FROM SECTION B. ALL QUESTIONS ARE WORTH 25 MARKS EACH.

REQUIREMENT: CALCULATOR

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

SECTION A: COMPULSORY

Question 1

a) Why is it necessary to standardize rates? Which type of standardization do you prefer and why? (4)

b) How is the standard population selected? (4)

c) You are presented with data of three countries in **table 1**

Table 1: Population size for three hypothetical populations

	Country A	**Country B**	**Country C**
Mid-year population by age group			
0-4 years old	500	1500	500
5-39 years old	4000	4000	5000
40+ years old	1500	500	500
Number of deaths , by age group			
0-4 years old	50	120	40
5-39 years old	20	40	50
40+ years old	60	40	40

Using data in table 1:

i. What are the crude death rates for each country? (3)

ii. Using population A as the standard, calculate the directly standardised crude death rates for countries B and C. Do these standardised rates tell you anything about mortality that was not visible from the crude rates calculated in question ci? (7)

iii. Using population A as the standard, calculate the indirectly standardised crude death rate of country B (7)

SECTION B: ANSWER ANY TWO QUESTIONS

Question 2

a) Show the equation for calculating the Singulate Mean Age at Marriage (SMAM) and define the component of the equation. (6)

b) Using the data **table 2** determine the Singulate Mean Age at Marriage (SMAM) and comment on your answer (7)

Table 2: Proportion single among women in a hypothetical country in 1998

Age group	Proportion single
15-19	98.8
20-24	78.3
25-29	48.6
30-34	33.7
35-39	27.0
40-44	24.0
45-49	23.1
50-54	22.1

c) Differentiate between marriage and nuptiality (2)

d) Name and Differentiate between the two types of nuptiality tables (4)

e) Divorce and annulment (2)

f) Describe any two measures of marriage and explain their parameters (4)

Question 3

Table 3: Data on Fertility

Age group	nLx	All women	Children born	Female children
15-19	496531	10960	1708	804
20-24	495902	9360	1996	940
25-29	495168	8015	1608	756
30-34	494213	5840	960	452
35-39	492760	4960	672	316
40-44	490447	3580	292	136
45-49	486613	3470	84	40

Using data provided in table 3 to answer the following questions:

a) Estimate the General fertility rate and provide interpretation (4)

b) Estimate the Total Fertility rate and provide interpretation (4)

c) Describe the meaning of the Total fertility rate (2)

d) Estimate the Gross Reproductive rate and provide interpretation (4)

e) Estimate the net reproductive rate and provide interpretation (4)

f) What is the difference between net reproductive rate and gross reproductive rate? (3)

g) Why is the age specific fertility rate a better measure of fertility than Crude birth rate? (4)

Question 4

Table 4: Incomplete life table of South Africa males in 1996

x	${}_nM_x$	${}_nq_x$	${}_nP_x$	l_x	${}_nd_x$	${}_nL_x$	T_x	e_x
0	0.1111	0.0110	0.9890	100000	1098	98994	**(vii)**	**(viii)**
1-4	0.0118	0.0459	0.9541	98902	4535	384290	4951384	50.063
5-9	0.0013	0.0064	0.9936	94367	601	470334	4567094	48.397
10-14	0.0008	0.0041	0.9959	93766	388	468112	4096760	43.691
15-19	0.0022	0.0110	0.9890	93379	1026	**(vi)**	3628648	38.859
20-24	0.0076	**(i)**	0.9628	92353	3431	453258	3164088	34.261
25-29	0.0151	0.0725	0.9275	**(iii)**	6447	428371	2710830	30.485
30-34	0.0203	0.0967	0.9033	82475	7974	393246	2282458	27.674
35-39	0.0239	0.1131	**(ii)**	74501	8424	353140	1889212	25.358
40-44	0.0230	0.1090	0.8910	66078	7205	313550	1536072	23.246
45-49	0.0216	0.1027	0.8973	58873	**(iv)**	280442	1222522	20.766
50-54	0.0244	0.1156	0.8844	52825	6104	249938	942080	17.834
55-59	0.0286	0.1338	0.8662	46721	6250	218883	692142	14.815
60-64	0.0426	0.1934	0.8066	40470	7827	183754	473259	11.694
65-69	0.0632	0.2746	0.7254	32643	8965	141870	289505	8.869
70-74	0.1126	0.4428	0.5572	23678	10485	93152	147635	6.235
75-79	0.1849	0.6336	0.3664	13193	8359	45216	54483	4.130
80+	0.5216	1.0000	0.0000	4833	4833	9267	9267	1.917

Using the data in table 4, answer the following questions:

a) Fill in the missing cells (i) to (viii) in table 4. State clearly the notation used and formulae and briefly explain the meaning of each figure you have calculated. (18)

b) What is the probability of survival from birth to age 20? (2)

c) Distinguish between an abridged and a complete life table (2)

d) Give three (3) uses of life tables (3)

Question 5

a) What is a difference between a rate and a ratio? (2)

b) What is a difference between a cohort and a period rate? (2)

c) Briefly explain the rationale for using the mid-year population as a denominator for demographic rates and also write the formula. (2)

d) 2500 women aged 55 were given a health check, and 215 women were found to have high blood pressure. Two years later all 2500 women attended a second check and another 80 had developed high blood pressure.

   i. What was the prevalence of high blood pressure in women at age 55? (1)

   ii. What was the prevalence of high blood pressure in women at age 57? (1)

   iii. What was the incidence of high blood pressure in the two-year period in these women? (3)

e) **Table 5:** You are given the following births and infants deaths recorded in Sub-Saharan Africa in 1990.

Year	Births cohorts	Births	Deaths	Infant Deaths
1989	1989	4040958	39655	33645
1990	1989	---	___--	5861
1990	1990	4158212	38351	32490
1991	1990	----------	-------	5657
1991	1991	4110907	36766	31109

Using data in table 5, answer the following questions:

i. What is the conventional infant mortality rate in year 1990? (3)

ii. What is the adjusted infant mortality rate for 1990 using the Cohort method? (6)

iii. Do the rates above differ? If so, why do they differ and which one would you prefer as a better indicator of infant mortality experience of this population? (2)

iv. What is the rationale behind adjusting the infant mortality rate? (3)