UNIVERSITY OF SWAZILAND

MAIN EXAMINATION 2012

TITLE OF PAPER: DEMOGRAPHIC METHODS

CORSE NUMBER: DEM 202

TIME ALLOWED: 3 HOURS

INSTRUCTIONS: ANSWER QUESTION 1 AND 2 AND ANY TWO QUESTIONS FROM SECTION B. ALL QUESTIONS ARE WORTH 25 MARKS EACH.

REQUIREMENTS: CALCULATOR

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

SECTION A: COMPULSORY

Question 1

a) The standardized mortality ratio for the town of Burnley in England was 1.23 when the population of England as a whole was used as the standard. What does this tell you about the mortality in Burnley relative to that in England as a whole? (2)

b) Why is it necessary to decompose rates? (2)

c) The differences in crude death rates for two populations is due to differences in two components Describe the two components that are computed when decomposing the difference between two populations' crude death rate. (4)

d) 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. Compare the mortality experiences of the three populations using standardized indices. (15 marks)
   II. Comment on your results. (2 marks)

Population (in thousands) and Deaths by age

	England and Wales		Scotland	Northern Ireland
Age group	**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 2

a) The data in Table 2 relate to the country of Malawi. They come from a sample survey of the population of this country which took place in 1992. You are also told that the total number of urban women in the survey is 1334 and that the total number of rural women in the survey is 10 518.
   i) Calculate the general fertility rates for rural and urban areas.(12)
   ii) Calculate the total fertility rates for urban and rural areas.(2)
   iii) What do the results tell you about fertility in Malawi? (3)

Table 2: Proportion of women in rural and urban areas of Malawi and ASFR per woman by age, 1992

	Percentage of all women in age group		ASFR per woman	
Age	**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) Select the most appropriate answer to the following and justify your choice:

1. The difference between a generation life table and a period life table is that: i) the radix is different; ii) one refers to a true birth cohort and the other does not; iii) one uses a different method for calculating q_x than the other; iv) none of the above. (2)

2. Compared to developing countries, the age structures of the developed nations tend to be unusually favourable to i) high CBR and CDR; ii) and high CDR;(iii)low CBR and low CDR ; (iv)high CBR and low CDR. (2)

3. Typical age- specific fertility rates for women :i) are highest at ages 15-24 and lower thereafter; ii) are highest at ages 20-29 and lower at ages 15-19 and at ages over 30; iii) are highest at ages 25-34 and lowest at ages 15 -24 and ages over 35; iv) are fairly constant throughout the childbearing years. (2)

4. The chief difficulty with the net reproduction rate as a predictive device for population growth is that it: i) excludes the influence of fertility; ii) makes inadequate allowance for mortality; iii) is based on the rates of a single year; iv) overlooks the type of culture possessed by the population; v) only includes survivors of births in some past period. (2)

SECTION B: ANSWER ANY TWO QUESTIONS

Question 3

a) Distinguish between population projections and population estimates. (4)

b) Describe the factors to be considered before undertaking a projection.(8)

c) Distinguish between complete and abridged life tables. (2)

d) Using the period life table below, calculate the values for the gaps numbered (i) to (vi). For each value you calculate give the notation and formula, where applicable and show all your calculations.(11)

Table 3: Abridged life table for Females in the United States, 2004

Age	${}_nq_x$	l_x	${}_nd_x$	${}_nL_x$	T_x	e_x
0-1	0.005880	100000	588	99500	8010591	80.1
1-4	0.000999	99412	99	397409	7911090	79.6
5-9	0.000650	99313	65	496402	7513681	75.7
10-14	0.000750	(ii)	74	496054	7017279	(vi)
15-19	0.001898		(iii)	(iv)	6521225	65.8
20-24	0.002247	98985	222	494371	6025827	60.9
25-29	0.002597	98763	257	493174	5531457	56.0
30-34	(i)	98506	349	491660	5038283	51.1
35-39	0.005584	98157	548	489417	4546623	46.3
40-44	0.008712	97609	850	485920	4057206	41.6
45-49	0.012719	96759	1231	480718	3571286	36.9
50-54	0.018330	95528	1751		(v)	32.4
55-59	0.028488	93777	2672	462207	2617304	27.9

Question 4

a) Describe the sources of data for the analysis of migration (8)

b) Using the data in Table 4, calculate:
   a. in –migration rates for the North and Central regions (4)
   b. out-migration rates for the South and Central region (4)

Table 4: Enumerated population classified by region of birth and region of residence.

	Region of Residence/Enumeration		
Region of birth	North	Central	South
North	566193	41242	25792
Central	11388	1821940	66579
South	11586	87987	2371431

c) Is a stationary population also a stable population? Explain your answer. (4)

d) At the start of the 21st century, China had an estimated R_0 of 0.81297 and an R_1 of 23.52850. Calculate the population's intrinsic rate of natural increase and the mean length of a generation (5)

Question 5

a) Why is the study of nuptiality of particular importance in demography? (8)

(b) Using the data given below, calculate the singulate mean age at marriage for females in Sweden in 1945. Interpret your results.(7)

Table 5: Proportions of Females Never Married, Sweden, 1945

Age group	% single females
15-19	97.0
20-24	63.6
25-29	30.4
30-34	20.4
35-39	19.0
40-44	20.4
45-49	21.0
50-54	21.0

(c) Using the data in Table 6, project the female population aged 0-4 for a hypothetical population. Use the component method.(10)

Table 6: Female Population by Age (1970 and 1975) and ASFR.

Age	**Base Year Female Population**	**Projected Female Population**	**ASFR**
15-19	18200	20000	0.080
20-24	18000	19300	0.100
25-29	17800	18500	0.160
30-34	17600	18200	0.080
35-39	17400	18100	0.050
40-44	17200	18000	0.030
45-49	17000	17900	0.010

Additional information: ${}_5L_5/{}_5L_0 = 0.97895$

Question 6

a) It is often said that women generally live longer than men. Discuss this statement. (9)

b) Given the following births and infant deaths recorded in Belgium, calculate:

I. The conventional infant mortality rate for 1968. (3)

II. The adjusted infant mortality rate for 1968 using the cohort method (3)

III. The adjusted infant mortality rate for 1968 using the additive method (3)

Year	Birth Cohort	Age (yrs)	Deaths	Births
1967	1967	0	2 893	142 471
1968	1967	0	481	-------
1968	1968	0	2 603	138 214
1969	1968	0	302	--------

c) 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? (2)

iii) the total fertility rate (3)