UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION 2014

TITLE OF PAPER: DEMOGRAPHIC METHODS

COURSE NUMBER: DEM 202

TIME ALLOWED: 3 HOURS

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS. ALL QUESTIONS ARE WORTH 25 MARKS EACH.

REQUIREMENTS: CALCULATOR

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

Question 1

a) Why is it necessary to standardize rates? (3)

b) 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? (5)

c) The data in Table 1 refers to the male populations of Argentina and Colombia in the mid 1980s.

   a. Calculate the crude death rates for each country.(4)
   b. Using the population of Argentina as the standard, calculate the directly standardized death rate for Colombia.(10)
   c. Comment on your results. (3)

Table 1: Population (in thousands) and Deaths by age, Argentina and Colombia, mid 1980s

	Argentina		Colombia	
Age group	**Population (thousands)**	**Deaths**	**Population (thousands)**	**Deaths**
0-4	1767	11832	1857	5179
5-14	3062	1390	3372	2300
15-24	2430	2816	3123	6646
25-44	4101	9690	3724	12702
45-64	2755	36581	1587	15441
65+	1129	70138	478	27034

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

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) 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)

Question 3

a) Define the following terms and indices:
   i. Parity Progression Ratio (2)
   ii. Fecundability (2)
   iii. Livebirth (2)
   iv. Net Reproduction Rate (2)
   v. Total Fertility Rate (2)

b) Differentiate as clearly as possible, between the following pairs of concepts:
   i) Mean age at marriage and Singulate mean age at marriage (3)
   ii) Divorce and legal separation (2)

c) Calculate the singulate mean age at marriage for males and females in Mali using the data in Table 3.(10)

Table 3: Proportion single by age and sex, Mali, 1995-96

Age	Males	Females
15-19	99.6	98.6
20-24	89.1	77.7
25-29	58.6	42.9
30-34	33.2	21.7
35-39	20.8	12.5
40-44	13.7	8.4
45-49	10.9	6.5
50-54	10.0	7.0

Question 4

a) The following matrix shows the region of residence of a certain population according to the 1985 census enumeration and according to their reported place of residence in 1975:

Table 4: Migration Flow Matrix

Region of residence		**Region of residence in 1985**			
in 1975	A	B	C	D	Total
A	15000	1500	1800	2500	20800
B	200	23000	2000	3500	28700
C	50	100	4200	200	4550
D	18250	25800	10500	46200	100750

i. Estimate the number of intercensal in-migrants, out-migrants and net migrants for each district and the country as a whole. (14)
ii. Estimate the inter-regional migration rate (3)

b) Distinguish between projections and estimates. (4)

c) Describe two uses of population projections. (4)

Question 5

a) Why is it necessary to adjust the conventional infant mortality rate? (3)

b) Describe as clearly as you can the cohort method for adjusting the conventional infant mortality rate, giving the relevant formula as well. (5)

c) Populations that have a low mean age at marriage tend to have relatively higher levels of fertility. Briefly discuss this statement.(5)

d) You are given the following gross nuptiality table for a hypothetical population. Fill in the missing values numbered (i) to (vi) in Table 5, showing clearly the formulae and notations used for each answer. (12)

Table 5: Gross Nuptiality Table for a Hypothetical Population

Age	nM_x	$_nN_x$	S_x	$_nH_x$	$_nE_x$	nLx	T_x	P_x	e_x
15-19	0.0630	0.27215	100000	27215	62071	431962	1750292	0.6207	17.5
20-24	0.0794	0.33120	72785	24106	34856	(iv)	(v)	0.4789	18.1
25-29	0.0290	0.13534	48679	6588	10750	226925	1014670	0.2208	(vi)
30-34	0.0100	(i)	42091	2048	(iii)	205335	787745	0.0989	18.7
35-39	0.0050	0.02492	40043	998	2114	197720	582410	0.0528	14.5
40-44	0.0031	0.01522	(ii)	594	1116	193740	384690	0.0286	9.9
45-49	0.0027	0.01357	38451	522	522	190950	190950	0.0136	5.0
50-54	0.0010	---	37929	---	---	---	---	---	---

Question 6

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

b) Complete the following life table, showing clearly the notation and formulae used. (12)

Table 6: Abridged life table for country X

Age	nqx	l_x	$_nd_x$	nLx	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	(vi)	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

c) Use this life table to answer the following questions:
   i. What is the probability of survival between exact age 10 and 30 given survival to age 10? (2)
   ii. What is the probability of surviving from birth to age 25? (2)
   iii. What is the probability of dying between exact ages 15 and 20 given survival to age 15? (2)

d) Conceive of the life table as a stationary population in which nLx is the number of persons alive between ages x and x+n.
   i. What is the proportion of those aged 20-24 in the stationary population? (2)
   ii. What is the death rate? (2)
   iii. What is the death rate above age 30? (1)