UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION 2007

TITLE OF PAPER: DEMOGRAPHIC METHODS

CORSE 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) Define and present formulae for calculating the crude death rate and the age-specific death rates. (4)
(b) Are these indicators age dependent? Explain (2)
(c) Using the data provided in Table 1, compare and discuss the death rate for males in Mauritius using the appropriate method of standardization. (12)
(d) Why is it necessary to decompose the difference between two demographic rates? (2)
(e) Present a formula for computing the "age composition effect" when decomposing the difference between two populations' crude death rates, and define the components of the formula. (5)

Question 2

(a) Distinguish between rates and ratios. (4)
(b) Which of the following indices are age dependent? (2)
- gross reproduction rate
- crude death rate
- crude rate of natural increase
- age specific death rate

(c) On the basis of the data on Table 2, calculate:
(i) the age specific fertility rates and interpret one of them (8)
(ii) the gross reproduction rate and interpret it (5)
(iii) the mean age of child bearing (3)

(d) Define a parity progression ratio and present a formula for its calculation (3)

Question 3

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

(b) It is often said that women generally live longer than men. Discuss this statement. (5)

(c) Using Table 3, construct a gross nuptiality table (15)

Question 4

(a) The table below is an incomplete life table for a hypothetical country. Fill in the gaps which are numbered (i) to (v) and for each gap you fill in, show clearly the formulas and the notation used. (10)

Age	${}_nq_x$	${}_nP_x$	l_x	${}_nL_x$	${}_nd_x$	T_x
0	-	-	10,000	-	-	-
1-4	-	-	8,834	(i)	-	-
5-9	-	-	8,498	-	-	-
10-14	-	-	8,402	-	-	-
…	..	..	..	..	..	..
…	..	..	..	..	..	..
85+	(ii)	(iii)	405	1,056	(iv)	(v)

(b) Distinguish between the following:
- (i) incidence and prevalence. (2)
- (ii) exogenous and endogenous causes of death (give an example for each). (6)
- (iii) neonatal and post-neonatal mortality. (4)

(c) Define a life table. (3)

Question 5

(a) A net nuptiality table is a type of double-decrement life table. Which are the two forces of decrement, and which is the state being decremented? (3)

(b) Explain the meaning of, and provide the formula for calculating the following net nuptiality table functions:
- (i) e_x (3)
- (ii) l_x (3)

(c) Provide the formula for computing the singulate mean age at marriage, defining all the components of the formula. (6)

(d) Table 4 represents the number of live births and the number of infant deaths by age at death for Romania. From these data calculate for each year:
- (i) the infant mortality rate (IMR). (2)
- (ii) the neo natal mortality rate. (2)
- (iii) the post neonatal mortality rate (2)

(e) These rates suggest that there has been a shift in the age pattern of mortality. Describe the shift. (4)

Question 6

(a) Distinguish between lifetime and intercensal migration. (2)
(b) List the major sources of migration data. (4)
(c) What critical assumptions underlie the census survival ratio method for calculating net-intercensal migration rates? (5)
(d) 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.

Migration Flow Matrix

Region of residence in 1975	Region of residence in 1985 A	B	C	D	Total
A	15000	1500	1800	2500	20800
B	200	23000	2000	3500	28700
C	50	100	4200	200	4550
D	3000	1200	2500	40000	46700
Total	18250	25800	10500	46200	100750

(i) Estimate the inter-censal migration rate for each region. (8)
(ii) Estimate the inter-regional migration rate. (3)
(iii) Estimate the in-migration and out-migration rate for region D only. (3)

TABLE 1: Population and deaths (in thousands) by Age for Mauritius and Germany

Mauritius			**Germany**	
Age	**Population**	**Deaths**	**Population**	**Deaths**
0-14	161.4	0.692	6590.8	9.3
15-24	98.3	0.102	4516.7	6.7
25-34	59.2	0.152	4207.4	6.4
35-44	39.7	0.228	4709.9	13.9
45-54	36.8	0.437	3508.6	25.6
55-64	23.4	0.838	2412.7	19.4
65+	14.1	1.422	3368.7	253.0

TABLE 2: Mid Year Female Population by Age (1977) and children born to them, Malawi.

Age	Population	Births
15-19	280,018	36,853
20-24	254,149	71,119
25-29	233,239	64,160
30-34	161,081	38,803
35-39	144,989	28,348
40-44	109,000	13,708
45-49	113,341	7,830

Additional information: the Sex Ratio at Birth is 1.04

TABLE 3: Number of Women and First Marriages by Age

Age	No. of women (in thousands)	No. of first marriages (in thousands)
15-19	311.1	19.6
20-24	228.0	18.1
25-29	155.0	4.5
30-34	140.4	1.4
35-39	138.7	0.7
40-44	130.4	0.4
45-49	109.8	0.3
50-54	98.7	0.1

TABLE 4: Number of live births and infant deaths by age for Romania, 1967 and 1970

	Infant deaths	
Age (months)	**1967**	**1970**
0	12276	7783
1	3625	3009
2	2639	2461
3	2101	2155
4	1384	1584
5	829	1151
6	530	826
7	365	621
8	274	448
9	227	450
10	178	339
11	162	283
Total live births	**527 764**	**427 034**