

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION 2012

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) Using the data provided in Table 1, compare and discuss the death rate for males in Mauritius using the appropriate method of standardization. (12)

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

- b) Table 2 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)

TABLE 2: Number of live births and infant deaths by age for Romania, 1970 and 1980

Age (months)	Infant deaths	
	1970	1980
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

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

Question 2

- (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)

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

Question 3

- a) On the basis of the data on Table 4, 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)
 - (iv) the total fertility rate (3)
- b) Define a parity progression ratio and present a formula for its calculation (3)
- c) What additional information is needed to compute the net reproduction rate? (3)

TABLE 4: 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

Question 4

- (a) Distinguish between lifetime and intercensal migration. (4)
- (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 census enumeration and according to their reported place of birth. Using the data in Table 5, calculate the following:
 - I. Out-migration rates from each region (6)
 - II. The in-migration rates for each region (6)

Table 5: Enumerated population classified by region of birth and region of residence.

Region of birth	Region of Residence/Enumeration			Total
	North	Central	South	
North	566193	41242	25792	633227
Central	11388	1821940	66579	1899907
South	11586	87987	2371431	2471004
Total	589167	1951169	2463802	5004138

Question 5

- a) Distinguish between complete and abridged life tables. (2)
- (b) Use the period life table below to answer the following questions:
- (i) Compute values in the gaps numbered (i) to (iv). For each, give the notation and formula, where applicable. (8)
 - (ii) What is the probability of a new born surviving from birth to age 50? (2)
 - (iii) How many years would a person who survives to age 20 expect to live in the age interval 20-55? (3)

Now, conceive of the life table as a stationary population. Answer the following questions:

- (i) What is the total size of the population? (2)
- (ii) What is the crude birth rate? (2)
- (iii) What is the death rate above age 70? (2)
- (iv) What is the annual number of deaths between ages 60 and 65? (2)
- (v) What is the mean age at death? (2)

Table 3: Abridged life table for England and Wales females, 1985

Age	nq_x	l_x	nd_x	nL_x	T_x	e_x
0-1	0.008252	100000	825	99258	7756261	77.56
1-4	0.001630	99175	162	396311	7657003	77.21
5-9	0.000905	99013	89	494842	7260692	73.33
10-14	0.000935	(i)	93	494388	6765850	(iv)
15-19	0.001409		(ii)		6271462	63.46
20-24	0.001534	98692	152	493080	5777654	58.54
25-29	0.001818	98540	179	492253	5284574	53.63
30-34	0.002826	98361	278	491110	4792321	48.72
35-39	0.004410	98083	432	(iii)	4301211	43.85
40-44	0.007199	97651	693	486523	3811876	39.04
45-49	0.012348	96958	1197	481798	3325353	34.30
50-54	0.020831	95761	2005	473793	2843555	29.69
55-59	0.035455	93756	3324	460470	2369762	25.28
60-64	0.058507	90432	5291	438933	1909292	21.11
65-69	0.087310	85141	7434	407120	1470359	17.27
70-74	0.139189	77707	10816	361495	1063239	13.68
75-79	0.220993	66891	14782	297500	701744	10.49
80-84	0.352367	52109	18362	214640	404244	7.76
85+	1.000000	33747	33747	189604		5.62

Question 6

- (a) Someone proposes calculating an infant mortality rate using the number of births in given calendar year t in the denominator and the number of deaths of persons under age 1 in the same calendar year, t in the numerator arguing this would better reflect the mortality experience of the birth cohort.
- I. Why might this suggestion not work well in practice? (3 marks)
 - II. Suggest a modification to the proposal which should lead to an infant mortality rate which better reflects the experience of the births occurring in year t . Use a Lexis diagram to illustrate the rationale behind this argument. (10 marks)
- a) What are the assumptions of a stable population? (8)
- b) Give 2 uses of a stable population. (4)