

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION 2011

TITLE OF PAPER: DEMOGRAPHIC METHODS

COURSE 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) Why is it necessary to decompose rates? (2)
- b) Describe the two components that are computed when decomposing the difference between two populations' crude death rate. (5)
- c) Using the statistics in the table below, and using the population of the UK as the standard population, calculate the following for Kuwait:
 - a. The directly standardized death rate.(9)
 - b. The standardized mortality ratio.(6)
 - c. Comment on your results. (3)

Table 1: Population and Deaths by age, UK and Kuwait, 1996

Age group	UK		Kuwait	
	Population	Deaths	Population	Deaths
0-4	3 763 438	6018	183 169	620
5-14	7 594 916	1207	329 010	106
15-24	7 325 068	4264	267 584	181
25-44	13 223 708	12 849	765 975	627
45-64	13 354 266	92 470	185 232	967
65+	9 250 797	514 960	23 011	1314

Question 2

- a) Differentiate as clearly as possible, between the following pairs of concepts:
 - i. Marriage and Consensual union (3)
 - ii. Annulment and Divorce (3)
- b) Provide the formula for calculating the singulate mean age at marriage, clearly defining each of the components of the formula. (8)
- c) Using the data in Table 2 below, calculate the mean age at marriage for males and females and give an interpretation of the results.(11)

Table 2: Number of people marrying for the first time by age and sex, England, 1991

Age	Males	Females
15-19	4 630	17 704
20-24	74 378	103 689
25-29	91 675	72 523
30-34	34 560	21 000
35-39	10 252	5 785
40-44	3 998	2 075
45-49	1 520	911

SECTION B: ANSWER ANY TWO QUESTIONS

Question 3

- a) Distinguish between an abridged life table and a complete life table. (5)
- b) Using the data in Table 3, construct an abridged life table for the Male population.(20)

TABLE 3: Male Population and Deaths by Age, England and Wales, 1982

Age	Population	Deaths
1-4	1,571,400	4,566
5-9	1,557,600	391
10-14	1,947,500	546
15-19	2,121,200	1,669
20-24	1,942,800	1,668
25-29	1,708,200	1,409
30-34	1,764,700	1,735
35-39	1,734,500	2,246
40-44	1,417,200	3,280

Question 4

- a) Table 4 shows the numbers of males by age group recorded in the Barbados censuses of 1970 and 1980. It is assumed that the intercensal mortality conditions are represented by the given life table values. Using the life table forward survival ratio method, calculate:
 - i. The number of net migrants for the age groups 15-19 and 35-39 in 1980. (6)
 - ii. The net intercensal migration rates for the above age groups. (6)

Table 4: Male Population and life table survivorship by age, Barbados, 1970 and 1980

Age group	Male Population		Life table survivorship	
	1970	1980	Age x	${}_nL_x$
10-14	14996	12859	10	479193
15-19	12829	13642	15	477275
20-24	9875	12382	20	474287
25-29	5724	10001	25	470794
30-34	4808	7724	30	467100
35-39	4295	5019	35	462661
40-44	4540	4379	40	456544
45-49	4300	3862	45	447177

- b) Give the formula for projecting male births in a 5-year period using the female age distribution, female age specific fertility rates and life tables. (8)
- c) What data sources are needed to implement a cohort component projection for your country of residence?(5)

Question 5

- a) If the crude birth rate in a country remains constant over a number of years but the general fertility rate increases steadily, what does this tell you about the country's population? (3)
- b) Using the data in Table 5, below calculate the following:
- ASFRs for age groups 15-19 to 45-49 (14)
 - The total fertility rate (3)
 - The Gross Reproduction Rate (4)
 - The Net Reproduction Rate (4)

Table 5: Statistics for fertility calculation, Australia, 1996

Age	Total births	Female births	Total women	Survival Probability
15-19	12509	5988	621542	0.99175
20-24	44837	21807	694273	0.98985
25-29	82782	40278	709746	0.98792
30-34	76435	37227	720453	0.98566
35-39	31864	15359	727555	0.98261
40-44	5113	2470	672182	0.97826
45-49	128	61	640985	0.97152

Question 6

- a) Someone proposes calculating an infant mortality rate using the number of births in a 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.
- a) Why might this suggestion not work well in practice? (2)
 - b) 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 . (4)
- b) Using the data below, calculate the adjusted infant mortality rate for country A in 1990 using the cohort method and the additive method (6)

Table 6: Births and Deaths by Cohort, Country A,

Year	Birth Cohort	Births	Deaths	Infant Deaths
1989	1989	4 040 958	39 655	33 645
1990	1989	-----		5 861
1990	1990	4 158 212	38 351	32 490
1991	1990	-----		5 657
1991	1991	4 110 907	36 766	31 109

- c) Provide a concise definition of the following concepts:
- i. Demographic analysis (2)
 - ii. A Lexis diagram (2)
- d) Define the following gross nuptiality table functions and provide the formula used for computing each function:
- i. ${}_nH_x$ (3)
 - ii. P_x (3)
 - iii. ${}_nL_x$ (3)