

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION

ACADEMIC YEAR: 2012/2013

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) Using the data for country A and Country B as given below:
- I. What are the infant mortality rates for country A and B? (4)
 - II. What percentage of the infant deaths in each country are neonatal deaths? (2)
 - III. What does this imply on the likely level of development of country A compared to country B? Explain.(3)

Table 1: Data for Countries A and B in 1990

	Country A	Country B
No. of women aged 15-49	200,000	250,000
Children under age 5	400,000	550,000
Births	50,000	50,000
Infant deaths	7500	5000
Neonatal deaths	3500	1250

- (b) Distinguish between the following:
- I. exogenous and endogenous causes of death (give an example for each). (6)
 - II. neonatal and post-neonatal mortality. (4)
- (c) Given the following births and infant deaths recorded in Belgium, calculate:
- I. The conventional infant mortality rate for 1968. (2)
 - II. The adjusted infant mortality rate for 1968 using the cohort method (2)
 - III. The adjusted infant mortality rate for 1968 using the additive method (2)

Table 2: Births and Infant deaths in Belgium, 1967-69

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	-----

Question 2

- a) What are the limitations of the national growth rate method for estimating internal migration?(4)
- b) What are the assumptions for the survival ratio methods? (4)
- c) What is the main difference between the forward survival ratio method and the reverse survival ratio method? (3)
- d) Using the data in Table 3, calculate:
 - I. in -migration rates for the Hhohho and Shiselweni regions (2)

II. out-migration rates for the Manzini and Lubombo region (2)

Table 3: Enumerated population classified by region of birth and region of residence, Swaziland

Region of birth	Region of Residence/Enumeration			
	Hhohho	Manzini	Shiselweni	Lubombo
Hhohho	169878	4824	1887	2761
Manzini	7287	170743	7321	4906
Shiselweni	1442	2995	135396	1476
Lubombo	3130	6357	2615	139439

(d) Using the data in Table 4, calculate the number of births born to women aged 15-49 that survive to be aged 0-4 in 1986. (10)

Table 4: Indian Female Population by Age and ASFR

Age group	Population 1981	Population 1986	ASFR
15-19	33 163 600	38 882 496	0.0436
20-24	28 482 300	32 498 670	0.1242
25-29	25 072 700	27 787 902	0.1127
30-34	21 734 600	24 377 183	0.0795
35-39	18 950 900	21 050 612	0.0468
40-44	16 452 800	18 271 889	0.0236
45-49	13 960 400	15 762 934	0.0115

Additional Information: Survivorship ratio is 0.88827

Question 3

- What is standardization? (2)
- What are the guidelines for choosing a standard population? (3)
- Using the data below, compare and discuss death rates for Country A and B using the appropriate method of standardization. (15)

Table 5: Age distribution and age-specific mortality for the UK and Kuwait, 1996

Age group	A United Kingdom		B Kuwait	
	Population	Deaths	Population	Deaths
0-14	11 358 354	7225	512 179	726
15-29	11 902 658	7571	495 541	317
30-44	12 935 390	16 671	538 018	491
45-59	10 582 022	53 998	166 343	678
60-69	5 418 489	100 896	29 744	587
70+	6 604 552	452 536	12 156	1016

- d) 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 4

- a) Define the following life table functions:

- I. ${}_nq_x$ (2)
- II. e_0 (2)
- III. ${}_nM_x$ (2)
- IV. ${}_nL_x$ (2)
- V. T_x (2)

- b) You are given the following gross nuptiality table for a hypothetical population. Fill in the missing values numbered (i) to (vi) in Table 6, showing clearly the formulae and notations used for each answer. (12)

Table 6: Gross Nuptiality Table for a Hypothetical Population

Age	${}_nM_x$	${}_nN_x$	S_x	${}_nH_x$	${}_nE_x$	${}_nL_x$	T_x	P_x	e_x
15-19	0.0630	0.27215	100000	27215	62071	431962	175029 2	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	101467 0	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	---	---	---	---	---	---

- c) At the start of the 21st century, China had an estimated R_0 of 0.81297 and an R_1 of 23.528. Calculate the population's intrinsic rate of natural increase. (3)

Question 5

- a) Why is the study of nuptiality of particular importance in demography? (8)
- b) 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? (4)
- c) Using the data in Table 7 below, calculate the mean age at marriage for males and females and give an interpretation of the results.(11)

Table 7: 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

- d) What is meant by population projection? (2)

Question 6

- (a) Provide a concise definition of the following concepts:
 - i. Demographic analysis (2)
 - ii. A Lexis diagram (2)
 - iii. Reproductivity (2)
- b) 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)
- c) Using the data in Table 8, below calculate the following:
 - i) ASFRs for age groups 15-19 to 25-29 (6)
 - ii) The total fertility rate (4)
 - iii) The Gross Reproduction Rate (3)
 - iv) The Net Reproduction Rate (3)

Table 8: 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