

**UNIVERSITY OF SWAZILAND**

**MAIN EXAMINATION 2008**

**TITLE OF PAPER: DEMOGRAPHIC METHODS**

**COURSE NUMBER: DEM 202**

**TIME ALLOWED: 3 HOURS**

**INSTRUCTIONS: ANSWER QUESTION 1 AND ANY THREE QUESTIONS.  
ALL QUESTIONS ARE WORTH 20 MARKS EACH.**

**REQUIREMENTS: CALCULATOR**

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

## Section A: Compulsory

### Question 1

- Distinguish between period analysis and cohort analysis (4)
- State the advantages and disadvantages of each of the above concepts. (8)
- Define a parity progression ratio and present a formula for its calculation (3)
- (d) A certain hypothetical population has the following parity progression ratios:

$$P_1 = 0.89$$

$$P_2 = 0.85$$

$$P_3 = 0.81$$

Out of 1,000 women, how many remain childless and how many have exactly one child? (5)

## SECTION B: ANSWER ANY TWO QUESTIONS

### Question 2

- Why is it necessary to standardize rates? (3)
- Using the table below, compare and discuss the death rates for the two populations using the appropriate method of standardization. (15)

### Population and Deaths (in thousands) by age, Countries A and B

Age group	Country A		Country B	
	Population	Deaths	Population	Deaths
0-19	6418.0	30.6	1415.2	1.5
20-39	2736.1	4.8	1505.5	2.1
40-59	1220.6	4.7	1062.2	7.4
60+	588.0	8.0	742.3	34.1
Total	10962.7	48.1	4752.2	45.1

- What are the guidelines for choosing a standard population? (2)

**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. (6)
- c) 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)

**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

**Question 4**

- a) Using the data in Table 1 and the forward census survival ratio method, compute:
  - (i) the number of net inter-censal migrants for age groups 20-24 and 70+ (i.e. age in 1976) in the Shiselweni region. (5)
  - (ii) the net inter-censal migration rate for the age group 20-24 in the Shiselweni region. (3)
- b) Fill in the missing values numbered (i) to (vi) in Table 2, showing clearly the formulae used for each answer and show your calculations clearly. (12)

**Question 5**

- a) Differentiate as clearly as possible, between the following pairs of concepts:
  - i. Marriage and nuptiality. (2)
  - ii. Divorce and legal separation. (2)
  - iii. Mean age at marriage and singulate mean age at marriage. (4)
- b) Using the data provided in Table 3, project the female population aged 0-4 for a hypothetical population. (Use the component method). (12)

**Question 6**

Use the information in Tables 4 and 5 to answer the following questions:

- a) Calculate the parity progression ratios. (8)
  - b) Calculate the total fertility rate using the above calculated parity progression ratios. (4)
  - c) Also calculate the total fertility rate using the age-specific fertility rate approach. (2)
  - d) If as a result of a family planning campaign, the age-specific fertility rate for the age group 35-39 were reduced by 40%, by what percentage would the fertility rate be reduced? (3)
  - e) Compute the gross reproduction rate, assuming that the sex ratio at birth is 1.04. (3)
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**TABLE 1: Population Distribution of the Shiselweni Region by Age, Swaziland (1966,1976) and National Census Survival Ratios between 1966 and 1976.**

Age	Population 1966	Population 1976	Age for Survival ratios	Survival ratios
0-4	17,286	22,291	0-4 to 10-14	1.0612
5-9	17,129	20,713	5-9 to 15-19	0.8879
10-14	13,889	17,297	10-14 to 20-24	0.8036
15-19	9,084	12,013	15-19 to 25-29	0.9344
20-24	5,693	7,689	20-24 to 30-34	0.9823
25-29	5,615	6,087	25-29 to 35-39	0.9369
30-34	4,011	4,613	30-34 to 40-44	1.0358
35-39	4,551	4,834	35-39 to 45-49	0.9205
40-44	3,045	3,868	40-44 to 50-54	0.9608
45-49	3,082	4,131	45-49 to 55-59	0.8403
50-54	2,841	2,923	50-54 to 60-64	0.7672
55-59	1,700	2,497	55-59 to 65-69	1.0520
60-64	1,780	2,123	60+ to 70+	0.5309
65-69	2,028	1,624		
70-74	764	1,226		
75+	1,514	1,935		

Additional information: Sex Ratio at Birth = 1.04

**TABLE 2: 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	---	---	---	---	---	---

**TABLE 3: Female Population by Age (1970), Age-Specific Fertility Rates and Life Table Values (1970-75)**

Age	Population	Fertility Rate	$nL_x$
0-4	19,000		4,750
5-9	18,600		4,650
10-14	18,400		4,600
15-19	18,200	0.080	4,550
20-24	18,000	0.100	4,500
25-29	17,800	0.160	4,450
30-34	17,600	0.080	4,400
35-39	17,400	0.050	4,350
40-44	17,200	0.030	4,300
45-49	17,000	0.010	4,250
50-54	16,800		
55+	70,600		

**Table 4: Distribution of women by Number of Children Ever Born, Swaziland, 1976**

Number of CEB	Number of Women
0	35,217
1	15,332
2	13,565
3	12,387
4	11,770
5	11,285
6	10,029
7	8,733
8	7,362
9+	5,413

**Table 5: Age Specific Fertility Rates, Swaziland, 1976**

<b>Age</b>	<b>ASFR</b>
15-19	0.169
20-24	0.318
25-29	0.311
30-34	0.264
35-39	0.198
40-44	0.096
45-49	0.014