

**UNIVERSITY OF SWAZILAND**  
**FINAL EXAMINATION PAPER 2007**

**TITLE OF PAPER:       INDIRECT TECHNIQUES OF DEMOGRAPHIC  
ESTIMATION**

**COURSE CODE   :       DEM 303**

**TIME ALLOWED   :       THREE (3) HOURS**

**INSTRUCTIONS   :       ANSWER ALL QUESTIONS FROM SECTION A  
AND ANY THREE (3) QUESTIONS FROM  
SECTION B.**

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**SECTION A:****ANSWER ALL QUESTIONS****QUESTION 1 (14+6 marks)**

- a. You are given the following age specific fertility rates (ASFR) for Swaziland in 1986. Also provided are the applicable standard gompits for Brass Relational Gompertz model. Calculate the parameters of the Relational Gompertz model and interpret them.

Age Group	ASFR	Y*(x)
15-19	0.0825	-0.6913
20-24	0.1931	0.02564
25-29	0.1905	0.70000
30-34	0.1714	1.4787
35-39	0.1260	2.6260
40-44	0.0655	4.8097
45-49	0.0361	---

- b. For purpose of fitting, the Coale-Trussel model can be transformed into the following linear equation:

$$\ln [\Phi(i)/h(i)] = \ln M + m \cdot v(i)$$

Suppose this is fitted to data and the value of the intercept obtained is 0.3 while that of the slope is 1.6, what are the corresponding values of M and m? What are meanings of M and n?

**QUESTION 2 (20 marks)**

<sup>a</sup>As demographer in a government office you are given the following data for country X:

- i. Children ever born by 5 year age group of mother
- ii. Births in the last year by age of mother
- iii. Children ever born by duration of marriage of mother
- iv. Number of ever-married women in each age group
- v. Total number of women in each group

You are required to calculate the TFR from these data. Describe each of the methods you would use, clearly stating the strengths and weaknesses of each method.

**SECTION B: ANSWER ANY THREE (3) QUESTIONS**

**QUESTION 3 (6 + 6 + 8 marks)**

- a. State the assumptions of the widowhood method.
- b. What are the advantages of the widowhood method over the orphanhood method?
- c. Using the data on the proportions of ever-married respondents classified by age given below, calculate the male probability of survival from age 20 to age 35 and from age 20 to 40:

Age	NW (n)	NW (n-5)
30	0.9514	0.9729
35	0.9170	0.9514
40	0.8735	0.9170

You may find the following information useful:

n	a(n)	b(n)	c(n)	d(n)
30	-0.0284	-0.00465	0.00157	1.0822
35	-0.0159	-0.00638	0.00253	1.0831
40	-0.0041	-0.00784	0.00395	1.0596

Assume that  $SMAM_m = 25.3$  years and  $SMAM_f = 23.2$  years.

**QUESTION 4 (20 marks)**

Compare and contrast the Brass method for estimating child mortality based on one census/survey with that of using hypothetical data based on two censuses/surveys. Make sure to address issues related to assumptions, rationale, data requirements and computational procedures.

**QUESTION 5 (6 + 9 + 5 marks)**

- a. What are the assumptions of the Orphanhood method for estimating adult mortality using information from females not orphaned?

Change "are"  
to "have".  
#b.

You are the following data on proportion of females whose mothers were alive at the time of interview, classified by five-year age group:

Age group	Proportion of Females with Mothers alive
15-19	0.9283
20-24	0.8639
25-29	0.7911

Using the Manual X (Hill and Trussel) variant of the Orphanhood method, calculate  $l(45)/l(25)$ ,  $l(50)/l(25)$ , and  $l(50)/l(45)$  assuming the mean age at maternity is 30.0 years.

Given that:

n	a(n)	b(n)	c(n)
20	-0.1798	0.00476	1.0505
25	-0.2267	0.00737	1.0291
30	-0.3108	0.01072	1.0287

- d. What are the weaknesses of the above method?

#### QUESTION 6

(10 + 10 marks)

Describe in detail any two of the following methods:

- Reverse Survival Technique
- Preceding Birth Technique
- Sisterhood method.