UNIVERSITY OF SWAZILAND

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

FINAL EXAMINATION 2017

TITLE OF PAPER	: INDIRECT TECHNIQUES OF DEMOGRAPHIC ESTIMATION
COURSE CODE	: DEM 303
TIME ALLOWED	: THREE (3) HOURS
INSTRUCTIONS	: ANSWER FOUR QUESTIONS : SHOW ALL YOUR FORMULAE AND WORKINGS.
REQUIREMENTS	: CALCULATOR

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

Question 1 [25 Marks]

A demographer assessing parity data for a certain developing country observed its poor quality and decided to apply an el-Badry technique. Given this information:

a. Briefly explain three possible errors that could have generated poor parity data; [6]

b. State any two reasons that could have justified the demographer's application of the el-Badry technique on the observed data? [3]

c. What are the data requirements for the el-Badry technique? [3]

d. State one assumption of the el-Badry technique; [3]

After using the el-Badry technique, the demographer decided to use the Brass P/F ratio method to estimate fertility.

e. Which assumptions are required to apply the P/F ratio method? [4]

f. The demographer obtained a decreasing trend in the P/F ratios with age of the women. Explain what the derived P/F ratios for this developing country imply; [2]

g. Explain two advantages of using the Brass P/F ratio method. [4]

Question 2 [25 Marks]

Table 2.1 presents the data needed to compute Coale's indices for Country A in year 1984. The estimated total number of births in Country A in 1984 was 3,789,050 and there was a negligible amount of illegitimacy.

Table 2.1 Data for calculating Coale's indices for Country A, 1984

Age group	Hutterite marital ASFRs, 1921-30	Natural fertility n(a)	Deviation from fertility v(a)	Estimated population (000s)	
				All women	Married women
15-19	0.300	0.411	0.000	3899	2490
20-24	0.550	0.460	0.000	3201	2938
25-29	0.502	0.431	-0.279	2737	2481
30-34	0.447	0.395	-0.667	2221	2001
35-39	0.406	0.322	-1.042	1901	1621
40-44	0.222	0.167	-1.414	1432	1997
45-49	0.061	0.024	-1.671	1200	821

Using the data provided in Table 2.1:

a. Compute Coale's Indices of I_f, I_g and I_m; [10]

b. Comment on your answers in part b); [6]

c. Without any computation or derivation, write down the two formulae to estimate the Coale-Trussell fertility schedule of M and m scale parameters; [5]

d. Compute the M and m scale parameters using your formulae shown in part c). [4]

Question 3 **[25 Marks]**

a. State three uses of the Brass logit life table system; [3]

b. What is the advantage of using a logit life table system rather than an empirical model life table?; [2]

c. The Brass logit life table system is expressed as follows:

$$\lambda(l_x) = \alpha + \beta\lambda(l_x^s)$$

i. Explain in brief what is meant by the mathematical expression above? [3]

ii. Write down the formula for computing $\lambda(l_x)$. [2]

d. The values of α and β in the logit model life table are obtained after fitting a straight line in some way.

i. State the procedure on how to obtain that straight line; [3]

ii. Which commands in excel would you write to obtain α and β values? [2]

iii. Give the formulae for α and β you would use to get the same answers as in part d(ii) when using a calculator; [4]

iv. Using your formulae in d(iii) and data given in table below, calculate α and β [4]

age	standard logits	observed logits
1	-1.70593	-2.05952
5	-1.5524	-1.83178
55	-1.05987	-0.95938
65	-0.7579	-0.69315

e. Provide a formula you would use to derive a fitted life table using the parameters derived above. [2]

Question 4 **[25 Marks]**

Describe in detail **ANY ONE** of the following indirect estimation methods:

a. Widowhood method; **OR**

b. Orphanhood method.

Note: Your answer should be arranged to **describe** the method in terms of the following:

i) Purpose or rationale; [5]

ii) Data required; [5]

iii) Brass procedure computational steps, formulae may not be provided; **AND** [10]

iv) Assumptions; **OR** [5]

v) Limitations, any two needed. [5]