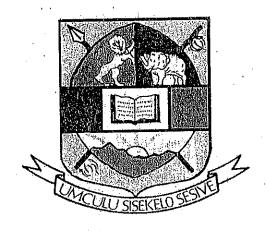# UNIVERSITY OF ESWATINI

MAIN EXAMINATION PAPER 2019

TITLE OF PAPER :   POPULATION DYNAMICS II

COURSE CODE   :   DEM 216

TIME ALLOWED   :   TWO (2) HOURS

TOTAL MARKS   :   100 MARKS

INSTRUCTION   :   ANSWER ALL <u>QUESTIONS</u>

Question 1

a. Describe and differentiate between the following concepts of population dynamics:

    i.   Infecundity vs Infertility   [5 marks]

    ii.   Parity vs Gravidity   [5 marks]

    iii.   Life expectancy vs Longevity   [5 marks]

    iv.   Endogenous vs Exogenous cause of death   [5 marks]

    v.   Demographic vs Epidemiological transition   [5 marks]

b. Describe and differentiate between the flowing concepts of migration.

    i.   Immigration vs Out-migration   [5 marks]

    ii.   Gross vs Net migration   [5 marks]

    iii.   Migrant vs mover   [5 marks]

Question 2

Using the theories of fertility transition, identify and explain any five factors that have contributed to the observed pattern of transition.

[20 marks]

Question 3

Describe the Epidemiological Transition Framework noting its rationale, stages and criticisms   **[20 marks]**

Question 4

Discuss the implications of migration on the demographic and economic profile of Eswatini.   **[20 marks]**

UNIVERSITY OF ESWATINI

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

MAIN EXAMINATION 2019

TITLE OF PAPER   :   INDIRECT TECHNIQUES OF DEMOGRAPHIC
                                            ESTIMATION

COURSE CODE   :   DEM 303

TIME ALLOWED   :   THREE (3) HOURS

INSTRUCTIONS   :   ANSWER ALL QUESTIONS
                                            SHOW ALL YOUR WORKINGS WHERE
                                            APPLICABLE.

REQUIREMENTS   :   SCIENTIFIC CALCULATOR

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

Question 1   [20]

1.1. Compare and contrast direct and indirect methods of demographic estimation? You are
      required to briefly explain four key points on each method.   [8]

1.2   The Coale and Trussell fertility model is expressed in the form:

$$r(a)/n(a) = M.e^{m.v(a)}$$

1.2.1 For the purpose of fitting m and M parameters, transform the above equation into a
       linear regression equation by taking natural logarithms.   [4]

1.3   Suppose the linear equation you obtained above is fitted to data using a least-squares
      method to fit this line and the value of the intercept is -0.892 while that of slope is 1.703;

1.3.1 what are the corresponding values of m and M?   [4]

1.3.2 what are the meaning of m and M values obtained above?   [4]

Question 2   [20]

Describe in detail **ANY ONE** of the following methods used when estimating mortality:

a. Widowhood method; or   [20]

b. Brass growth balance method.   [20]

Note: Make sure to explain the purpose, assumptions, data requirements, and limitations of the
method.

Question 3   [20]

As a population analyst employed by the Central Statistics Office you are tasked to estimate child
mortality for Eswatini using the 2017 population census data. Describe in detail the method you
would use, clearly stating your assumptions, data requirements, and limitations of the method
you have chosen.

Question 4 [20]

Consider the developing country A whose mortality experience is represented by the life table in Table 1.

Table 1: Mortality experience: Country A

Age x	Number surviving to age x out of 100,000 births
15	96457
20	95800
25	94912
30	94042
35	93044
40	91645
45	89537
50	86259

Using the data in Table 1, and the General Standard life table in **APPENDIX**:

4.1   What is meant by a relational system of model life tables?. [2]

4.2   Determine the parameters alpha (α) and beta (β) in a Brass logit model life table fitted to all ages or the data provided above. [10]

4.3   Interpret the values of the Brass parameters obtained in part b); [4]

4.4   Derive a fitted life table using the parameters derived in part b) and the General standard; and [2]

4.5   Compare the fitted life table values with the observed ones. [2]

APPENDIX

Table A1: Brass General and African Standard life table l_x's values

Age x	General Standard l_x	Age x	African Standard l_x
0	1	0	1
1	0.8499	1	0.8802
2	0.807	2	0.8335
3	0.7876	3	0.8101
4	0.7762	4	0.7964
5	0.7691	5	0.7863
10	0.7502	10	0.7502
15	0.7362	15	0.7362
20	0.713	20	0.713
25	0.6826	25	0.6826
30	0.6525	30	0.6525
35	0.6223	35	0.6223
40	0.5898	40	0.5898
45	0.5535	45	0.5535
50	0.5106	50	0.5106
55	0.4585	55	0.4585
60	0.3965	60	0.3965
65	0.321	65	0.321
70	0.238	70	0.238
75	0.1516	75	0.1516
80	0.0768	80	0.0768
85	0.0276	85	0.0276
90	0.0059	90	0.0059
95	0.0006	95	0.0006
100	0	100	0

Source: Carrier and Hobcraft (1973)