UNIVERSITY OF ESWATINI

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

RESIT EXAMINATION 2019

TITLE OF PAPER : INDIRECT TECHNIQUES OF DEMOGRAPHIC
ESTIMATION I

COURSE CODE : DEM 313

TIME ALLOWED : TWO (2) HOURS

INSTRUCTIONS : ANSWER ALL THREE 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

[20 Marks]

a. Explain the need and importance of indirect techniques of demographic estimation? **[12]**

b. Evaluation of fertility data on recent births and children ever born is vital beforehand detailed analysis. As a demographer tasked to evaluate recent census data collected in your country explain possible errors that you may encounter based on the information regarding:

    i.   Current or period fertility; and   **[4]**

    ii.   Parity or lifetime fertility.   **[4]**

Question 2

[20 Marks]

Census data in Table E2 was obtained on children ever born (CEB) and births in the last 12 months for women in country X in 2002. Based on these data, an attempt was made to estimate fertility using the Trussell variant of Brass P/F ratio method. The results are presented in Table E2 using standard symbols (in Manual X of United Nations). You may use in your calculations the relevant formulae and Table A1 coefficients in the appendix. The reported population for country X was 71,315,944.

Table E2

i	Age group	W(i)	CEB(i)	B(i)	P(i)	f(i)	Φ(i)	F(i)	w(i)	f+(i)	P(i)/F(i)	f*(i)
1	15-19	3014706	1160919	320406	-------	---------	0.5314	0.237	0.087	0.1262	--------	--------
2	20-24	2653155	4901382	609269	-------	---------	---------	-------	-------	---------	--------	--------
3	25-29	2607009	9085852	561494	-------	---------	---------	-------	-------	---------	--------	--------
4	30-34	2015663	9910256	367833	-------	---------	---------	3.323	-------	---------	--------	--------
5	35-39	1771680	10384001	237297	-------	---------	---------	4.094	0.205	0.1310	--------	--------
6	40-44	1479575	9164329	95357	-------	---------	---------	4.579	0.167	0.0568	--------	--------
7	45-49	1135129	6905673	38125	-------	---------	4.8288	4.790		0.0280	---------	--------

a) Calculate the values for columns P(i) to f+(i) in Table E2 as indicated by the blank spaces. **[10]**

b) Calculate P/F ratios for all age groups. **[2]**

c) Interpret the meaning of the P/F ratios you obtained above. **[2]**

d) Based on the values you obtained in (b), calculate the adjustment factor, k and give a reason on the method you have chosen. **[2]**

e) Calculate the adjusted fertility rate, f*(i). **[2]**

f) Using the results obtained above and data in Table E2, estimate the reported and adjusted total fertility rate for country X, and compare the results. **[3]**

g) State your assumptions for using the Brass P/F ratio method to estimate fertility. **[4]**

Question 3   [20 marks]

a. Describe the rationale of Relational Gompertz Model of fertility schedule.   [5]

b. What are the data requirements for this method?   [4]

c. State any three (3) assumptions of the method.   [6]

d. Explain the meaning of the parameters α and β in this relational fertility model. [5]

APPENDIX

Table A1: Table Coefficients for F(i) and f+(i)

Age group	a(i)	b(i)	c(i)	x(i)	y(i)	z(i)
15-19	2.531	-0.188	0.0024	0.031	2.287	0.114
20-24	3.321	-0.754	0.0161	0.068	0.999	-0.233
25-29	3.265	-0.627	0.0145	0.094	1.219	-0.977
30-34	3.442	-0.563	0.0029	0.12	1.139	-1.531
35-39	3.518	-0.763	0.0006	0.162	1.739	-0.3592
40-44	3.862	-0.2481	-0.0001	0.27	3.454	-21.497
45-49	3.828	0.016*	-0.0002			

$$F(7) = \phi(6) + a(7)f(7) + b(7)f(6) + c(7)\phi(7)$$

$$f^+(i) = (1 - w(i-1))f(i) + w(i)f(i+1)$$

$$w(i) = x(i) + y(i)\frac{f(i)}{\phi(7)} + z(i)\frac{f(i+1)}{\phi(7)}$$

$$F(i) = \phi(i-1) + a(i)f(i) + b(i)f(i+1) + c(i)\phi(7)$$

$$f^+(7) = (1 - w(6))f(7)$$