

**UNIVERSITY OF SWAZILAND**

**SUPPLEMENTARY EXAMINATION 2016**

**TITLE OF PAPER: DEMOGRAPHIC METHODS**

**COURSE NUMBER: DEM 202**

**TIME ALLOWED: 3 HOURS**

**INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS. ALL QUESTIONS ARE WORTH 25 MARKS EACH.**

**REQUIREMENTS: CALCULATOR**

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### Question 1

- a) The data in Table 1 refers to the male population of Argentina and Colombia in the mid 1980s.
- Calculate the crude death rates for each country.(4)
  - Using the population of Argentina as the standard, calculate the directly standardized death rate for Colombia.(10)
  - Comment on your results. (3)

**Table 1: Population (in thousands) and Deaths by age, Argentina and Colombia, mid 1980s**

Age group	Argentina		Colombia	
	Population (thousands)	Deaths	Population (thousands)	Deaths
0-4	1767	11832	1857	5179
5-14	3062	1390	3372	2300
15-24	2430	2816	3123	6646
25-44	4101	9690	3724	12702
45-64	2755	36581	1587	15441
65+	1129	70138	478	27034

- b) Why is it necessary to decompose rates? (2)
- c) The difference in the crude death rates for Mauritius and Germany is partly due to mortality differences and partly due to differences in their age composition. Describe the two components. (6)

### Question 2

- 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) Given the following births and infant deaths recorded in Belgium, calculate:
- The conventional infant mortality rate for 1968. (2)
  - The adjusted infant mortality rate for 1968 using the cohort method (2)
  - The adjusted infant mortality rate for 1968 using the additive method (2)

**Table 2: Births and Infant deaths in Belgium, 1967-69**

Year	Birth Cohort	Age (yrs)	Deaths	Births
1967	1967	0	2 893	142 471
1968	1967	0	481	-----
1968	1968	0	2 603	138 214
1969	1968	0	302	-----

(c) Using the data in Table 3, construct a gross nuptiality table. (14)

**TABLE 3: Number of Women and First Marriages by Age**

Age	No. of women (in thousands)	No. of first marriages (in thousands)
15-19	311.1	19.6
20-24	228.0	18.1
25-29	155.0	4.5
30-34	140.4	1.4
35-39	138.7	0.7
40-44	130.4	0.4
45-49	109.8	0.3
50-54	98.7	0.1

**Question 3**

- (a) Distinguish between lifetime and intercensal migration. (4)
- (b) List the major sources of migration data. (4)
- (c) What critical assumptions underlie the census survival ratio method for calculating net-intercensal migration rates? (5)
- (d) The following matrix shows the region of residence of a certain population according to the census enumeration and according to their reported place of birth. Using the data in Table 4, calculate the following:
- Out-migration rates from each region (6)
  - The in-migration rates for each region (6)

**Table 4: Enumerated population classified by region of birth and region of residence.**

Region of birth	Region of Residence/Enumeration			Total
	North	Central	South	
North	566193	41242	25792	<b>633227</b>
Central	11388	1821940	66579	<b>1899907</b>
South	11586	87987	2371431	<b>2471004</b>
<b>Total</b>	<b>589167</b>	<b>1951169</b>	<b>2463802</b>	<b>5004138</b>

**Question 4**

- a) What is meant by population projection? (3)
  - b) Describe two uses of population projections. (4)
  - c) What type of data would be needed to implement a cohort component projection? (3)
- a) Define the following terms and indices:
    - i. Parity Progression Ratio (2)
    - ii. Fecundability (2)
    - iii. Livebirth (2)
    - iv. Net Reproduction Rate (2)
    - v. Total Fertility Rate (2)
  - b) Differentiate as clearly as possible, between the following pairs of concepts:
    - i) Mean age at marriage and Singulate mean age at marriage (3)
    - ii) Divorce and legal separation (2)

**Question 5**

- a) Use the period life table below to answer the following questions:
  - (i) Compute the gaps numbered (i) to (v). For each computation, give the notation and formula, where applicable. (9)
  - (ii) How many years would a person who survives to age 30 expect to live in the age interval 30-60? (2)
  - (iii) What is the probability of dying between exact age 15 and 35? (2)
  - (iv) What is the life expectancy at age 25? In addition, give a verbal interpretation. (2)
- b) Now, conceive of the life table as a stationary population. Answer the following questions:
  - (i) What is the total size of the population? (2)
  - (ii) What is the crude birth rate? (2)

- (iii) What is the death rate above age 70? (2)
- (iv) What is the mean age at death? (2)
- (v) What is the annual number of births and deaths? (2)

**Table 5: Abridged life table for England and Wales females, 1985**

Age	n	$nq_x$	$l_x$	$nd_x$	$nL_x$	$T_x$	$e_x$
0-1	1	0.008252	100000	825	99258	7756261	77.56
1-4	4	0.001630	99175	162	396311	7657003	77.21
5-9	5	0.000905	99013	89	494842	7260692	73.33
10-14	5	0.000935	(i)	93	494388	6765850	(v)
15-19	5	0.001409		(ii)		6271462	63.46
20-24	5	0.001534	98692	152	493080	5777654	58.54
25-29	5	0.001818	98540	179	492253	5284574	53.63
30-34	5	0.002826	98361	278	491110	4792321	48.72
35-39	5	0.004410	98083	432	(iii)	4301211	43.85
40-44	5	0.007199	97651	693	486523	3811876	39.04
45-49	5	0.012348	96958	1197	481798	3325353	34.30
50-54	5	0.020831	95761	2005	473793	2843555	29.69
55-59	5	0.035455	93756	3324	460470	2369762	25.28
60-64	5	0.058507	90432	5291	438933	1909292	21.11
65-69	5	0.087310	85141	7434	407120	1470359	17.27
70-74	5	0.139189	77707	10816	361495	1063239	13.68
75-79	5	0.220993	66891	14782	297500	701744	10.49
80-84	5	0.352367	52109	18362	214640	404244	7.76
85+	5	1.000000	33747	33747	189604	(iv)	5.62

**Question 6**

- a) Populations that have a low mean age at marriage tend to have relatively higher levels of fertility. Briefly discuss this statement.(5)
- b) In general, there are 3 major reasons why people die. Discuss. (10)
- c) You are given a female population (in 5 year age groups), a female life table, and age specific fertility rates for a population in 2010. List the steps you would need to take and the assumptions you would need to make to predict the number of females under age 5 in 2015? (6)
- d) Give 2 uses of a stable population. (4)