

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION 2018

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

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

Question 1

- a) If a cohort is defined as "professional soccer players," and the relevant life experience is defined as starting with the first game played as a professional and ending with the last game played as a professional, which of the following would not be a possible attrition factor? (2)
- career-ending injury
 - retirement
 - death
 - all of the above are possible attrition factors
- c) Use the data presented in Table 1 below to compute the eventual probabilities of death for cause of death 1 and cause of death 2. Show all your calculations. (20)

Table 1: Distribution of life table deaths by cause for males in country X, 1960

Age	${}_n d_x$	${}_n q_x$	l_x	Deaths	Deaths ¹	Deaths ²
0-1	7230	0.07230	100000	2235	538	2
1-4	2566	0.02765	92770	654	140	13
5-9	768	0.00851	90204	142	10	8
10-14	569	0.00636	89436	87	1	5
15-19	570	0.00641	88867	72	2	4
20-24	793	0.00899	88298	87	0	6
25-29	712	0.00814	87504	67	0	7
30-34	854	0.00984	86792	70	2	4
35-39	1287	0.01497	85938	86	2	10
40-44	1849	0.02184	84651	103	1	23
45-49	2629	0.03175	82802	136	0	20
50-54	3615	0.04509	80173	159	3	46
55-59	4975	0.06498	76558	176	2	55
60-64	7979	0.11146	71583	233	4	74
65-69	10564	0.16609	63605	246	3	62
70-74	12107	0.22826	53040	246	5	47
75-79	13002	0.31765	40933	220	3	44
80-84	13724	0.49135	27931	169	5	23
85+	14207	1.0000	14207	154	5	13

- d) Based on your calculations above, provide answers for the following questions:
- How many people die due to cause of death 1 after age 10? (1)
 - Among 100 000 newborn children, how many will die at age 0 due to cause of death 2? (2)

Question 2

- a) Give three uses of life tables. (6)
- b) Using the life table below, compute the following life table indices showing clearly the notation and formulae used:

- i. l_{10} (2)
- ii. ${}_1d_0$ (1)
- iii. ${}_5L_5$ (2)
- iv. T_1 (2)
- v. e_{15} (2)

Table 2: Abridged life table for country X

Age	nq_x	l_x	${}_nd_x$	nL_x	T_x	e_x
0-1	0.03168	100000		97782	6997475	69.97
1-4	0.00793	96832	768	385793		
5-9	0.00344	960064	331		6513900	67.81
10-14	0.00280		268	477998	6034406	63.03
15-19	0.00444	95466	424	476269		
20-24	0.00613	95042	583	473752	5080139	53.45
25-29	0.00747	94459	706	470531	4606386	48.77
30-34	0.00911	93753	854	466632	4135855	44.11

- c) Define each of the following net nuptiality notation and provide a formula for their calculation: (10)
- i. $1000q_x$
 - ii. d'_x
 - iii. L'_x
 - iv. T'_x
 - v. e'_x

Question 3

- a) A net nuptiality table is a type of double decrement table. Which are the forces of decrement and which state is being decremented? (3)
- b) Give 3 uses of the net nuptiality table. (6)
- c) What are the limitations of the national growth rate method for estimating internal migration?(4)
- d) What are the assumptions for the survival ratio methods? (4)
- e) Using the data in Table 3, calculate:
 - (i) in –migration rates for the Hhohho and Shiselweni regions (4)
 - (ii) out-migration rates for the Manzini and Lubombo region (4)

Table 3: Enumerated population classified by region of birth and region of residence, Swaziland

Region of birth	Region of Residence/Enumeration			
	Hhohho	Manzini	Shiselweni	Lubombo
Hhohho	169878	4824	1887	2761
Manzini	7287	170743	7321	4906
Shiselweni	1442	2995	135396	1476
Lubombo	3130	6357	2615	139439

Question 4

- a) Define the following:
 - (i) Attrition factors (2)
 - (ii) Survival analysis (2)
 - (iii) Right censoring (2)
 - (iv) Follow up time (2)
 - (v) Migration expectancy (2)
- b) Give 2 uses of stable populations. (4)
- c) Describe 3 characteristics of a stable population. (6)
- d) Using the data for a growing Western population given in Table 4 below, compute the intrinsic growth rate for the population. (5)

Table 4: Data for a growing Western population, 2000

Age	Mid point	Female ASFRs	Survival probability ($5 L_x / 5 * l_0$)
15-19	17.5	0.01326	0.97914
20-24	22.5	0.04324	0.97703
25-29	27.5	0.07812	0.97421
30-34	32.5	0.07113	0.97061
35-39	37.5	0.02906	0.96577
40-44	42.5	0.00506	0.95870
45-49	47.5	0.00013	0.94751

Question 5

- a) Describe the problems associated with migration analysis (8)
- b) Distinguish between migration effectiveness and migration expectancy (4)
- c) How is migration expectancy different from life expectancy? (2)
- d) What is the difference between a gross and net nuptiality table? (2)
- e) What are the two important pieces of information in survival analysis? (2)
- f) Give 2 uses of survival analysis. (4)
- g) In a stable population which is declining in size, there are typically more people of middle age than at younger or older ages. Explain why. (3)