UNIVERSITY OF SWAZILAND

RE-SIT EXAMINATION 2018

TITLE OF PAPER: DEMOGRAPHIC METHODS II

COURSE NUMBER: DEM 212

TIME ALLOWED: 2 HOURS

INSTRUCTIONS: ANSWER ANY THREE QUESTIONS. ALL QUESTIONS ARE WORTH 30 MARKS EACH.

REQUIREMENTS: CALCULATOR

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

Question 1

a) What is the main difference between an ordinary life table and a multiple decrement life table (3)

b) 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? (3)

i. career-ending injury
ii. retirement
iii. death
iv. 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	${}_nd_x$	${}_nq_x$	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:

I. How many people die due to cause of death 1 after age 10? (2)
II. Among 100 000 newborn children, how many will die at age 0 due to cause of death 2? (2)

Question 2

a) Distinguish between generation and abridged life tables. (2)

b) Give three uses of life tables. (6)

c) Using the life table below, compute the following life table indices showing clearly the notation and formulae used:

i. l_{10} (2)
ii. ${}_1d_0$ (2)
iii. ${}_5L_5$ (2)
iv. T_1 (2)
v. T_{15} (2)
vi. 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

d) 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) At the start of the 20th century, China had an estimated R_0 of 0.81297 and R_1 of 23.52850. Calculate the mean length of a generation in China and the population's intrisic rate of natural increase. (3)

b) A net nuptiality table is a type of double decrement table. Which are the forces of decrement and which state is being decremented? (3)

c) What data are required for constructing a net nuptiality table? (2)

d) Give 3 uses of the net nuptiality table. (6)

e) What are the limitations of the national growth rate method for estimating internal migration?(4)

f) What are the assumptions for the survival ratio methods? (4)

g) 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 Residence/Enumeration			
Region of birth	**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) 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. (2)

c) Give 2 uses of stable populations. (4)

d) Describe 3 characteristics of a stable population. (6)

e) Using the data for a growing Western population given in Table 4 below, compute the intrisic growth rate for the population. (6)

Table 4: Data for a growing Western population, 2000

Age	Mid point	Female ASFRs	Survival probability ($5L_x/5^*l_0$)
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