UNIVERSITY OF ESWATINI

MAIN EXAMINATION 2019

TITLE OF PAPER: DEMOGRAPHIC METHODS II

COURSE NUMBER: DEM 212

TIME ALLOWED: 2 HOURS

INSTRUCTIONS: ANSWER QUESTION 1 AND ANY TWO QUESTIONS. ALL QUESTIONS ARE WORTH 30 MARKS EACH.

REQUIREMENTS: SCIENTIFIC CALCULATOR

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

Question 1 (Compulsory)

1.1 Distinguish between left censoring and right censoring (4)

1.2 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)

        (i)   career-ending injury

        (ii)   retirement

        (iii)   death

        (iv)   all of the above are possible attrition factors

1.3 What is meant by survival analysis? (2)

1.4 Describe the 3 estimates used for describing time to event in survival analysis. (6)

1.5 The survival experience of 2148 males with angina pectoris is recorded in years. Sixteen intervals of one year each are used. The information is summarised in the table below. Using the information given, construct a clinical life table. (16)

Interval in years	# alive at beginning of interval	# of deaths during interval
0.0	2418	456
1.0	1962	226
2.0	1697	152
3.0	1523	171
4.0	1329	135
5.0	1170	125
6.0	938	83
7.0	722	74
8.0	546	51
9.0	427	42
10.0	321	43
11.0	233	34
12.0	146	18
13.0	95	9
14.0	59	6
15.0	30	0

Question 2

2.1 What is the main difference between a conventional life table and a multiple decrement life table (2)

2.2 What is the major purpose of a multiple decrement table? (2)

2.3 Define and give two examples of attrition factors. (6)

2.4 Life tables are classified according to three categories. Discuss. (8)

2.5 Using the life table below, compute the life table indices labeled (i) to (vi) showing clearly the notation and formulae used. (6)

Table 2: Abridged life table for England and Wales females, 1985

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

2.6 Use the above period life table to answer the following questions:
   (i)   How many years would a person who survives to age 20 expect to live in the age interval 20-55? (2)
   (i)   What is the probability of dying between exact age 40 and 60 when given survival to age 40? (2)

(ii)   What is the life expectancy at age 25? In addition, give a verbal interpretation (2)

Question 3

3.1 Distinguish between a gross and net nuptiality table.(2)

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

3.3 Explain the meaning of, and provide the formula for calculating the following net nuptiality functions:

(i) v'_x (2)
(ii) T'_x (2)
(iii) L'_x (2)
(iv) $\%N'_x$ (2)

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

3.5 Using Table 3, calculate:
       I. The number of net migrants for the age groups 20-24 and 35-39 using the forward life table survival ratio method. (6)
      II. The net intercensal migration rates for the above age groups (4)

Table 3: Male Population and life table survivorship by age, Barbados, 1970 and 1980.

| Age group | Male Population | | Life table survivorship | |
	1970	1980	Age x	$_nL_x$
10-14	14996	12859	10	479193
15-19	12829	13642	15	477275
20-24	9875	12382	20	474287
25-29	5724	10001	25	470794
30-34	4808	7724	30	467100
35-39	4295	5019	35	462661
40-44	4540	4379	40	456544
45-49	4300	3862	45	447177

Question 4

4.1 Describe the sources of data for the analysis of migration (8)

4.2 Describe the problems associated with migration analysis (6)

4.3 Give 2 uses of stable populations. (4)

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

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

Age Group	Female ASFRs per woman	Probability of survival $_5L_x/l_0$
15-19	0.01289	0.98615
20-24	0.05007	0.98376
25-29	0.07120	0.98134
30-34	0.03947	0.97877
35-39	0.01205	0.97530
40-44	0.00215	0.96960
45-49	0.00012	0.96003