



Uva Wellassa University
Faculty of Management



Degree of Bachelor of Business Management in Entrepreneurship and Management
FOURTH YEAR FIRST SEMESTER EXAMINATION - FEBRUARY / MARCH 2012

EMG 431 -3 Actuarial Mathematics II

Part C – Essay Questions

Answer **only Two (02)** questions.

Marks allocation: 50 Marks

01.

a) Write down the meaning of the following expressions in your terms.

i). ${}_2q_{50:40} = 0.055$

ii). ${}_2p_{50:40} = 0.045$

iii). $q_x^{(1)} = 0.05$

iv). ${}_2q_x^{(T)} = 60\%$

(12Marks)

b) Let $T(40)$ and $T(60)$ are independent. Mortality of (40) follows

$$\mu(x) = \frac{1}{100-x} \text{ for } 0 \leq x \leq 100 \text{ and mortality of (60) follows de Moivre's law with}$$

$$w=100.$$

i). Calculate ${}_tP_{40}$ (05Marks)

ii). Calculate ${}_tP_{60}$ (05Marks)

iii). Calculate ${}_tP_{40:60}$ (03Marks)

02. Consider that there are two independent lives (40) and (50). The (40) follows constant force of mortality $\mu(40+t) = 0.04$ and the (50) follows de Moivre's law with $w=150$. The force of interest is given as $\delta = 0.06$

i). Find an expression for ${}_tP_{40:50}$ (05Marks)

ii). Find an expression $\mu_{40:50}(t)$ (05Marks)

iii). Find an expression $f_{T(40:50)}(t)$ (05Marks)

iv). Calculate $\bar{A}_{40:50}$ (05Marks)

v). Calculate $\bar{a}_{40:50}$ (05Marks)

03. You are given a part of a three-decrement table as follows.

x	$d_x^{(1)}$	$d_x^{(2)}$	$d_x^{(3)}$	$d_x^{(T)}$	$l_x^{(T)}$
40	5,168	1,157	4,293	10,618	4,832,555
41	5,363	1,206	5,162	11,731	4,821,937
42	5,618	1,443	5,960	13,021	4,810,206
43	5,929	1,679	6,840	14,448	4,797,185
44	6,277	2,152	7,631	16,060	4,782,737

Find

- a) The probability that (40) will survive for another 3 years. (05Marks)
- b) The probability that (43) will exit the group within two years due to decrement 1. (05Marks)
- c) The probability that (40) will exit the group within age 42 and 44 due to decrement 2. (05Marks)
- d) The probability that (42) will exit the group between the age 43 and 44. (05Marks)
- e) The probability that (40) will exit the group during the 3rd year. (05Marks)

