CUCEO

CHEPKOILEL UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF MOI UNIVERSITY)

UNIVERSITY EXAMINATIONS
2011/2012 ACADEMIC YEAR
FIRST SEMESTER REGULAR EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN
ACTURIAL SCIENCE

COURSE CODE: ACS 101

COURSE TITLE: INTRODUCTION TO ACTUARIAL SCIENCE

DATE: 30ᵀᴴ NOVEMBER, 2011   **TIME:** 2.00 P.M – 5.00 P.M

INSTRUCTIONS TO CANDIDATES

- SEE INSIDE

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CHEPKOILEL UNIVERSITY COLLEGE

ACS 101 : INTRODUCTION TO ACTUARIAL SCIENCE-2011/2012

SECTION A (Attempt   all Questions)

Question 1

a) Suppose you have borrowed a five year loan of Ksh 100,000 at 10 per cent from your employer to buy a motor cycle. If your employer requires a five equal end of year repayments, then what will be?

(i) Annual installment.

(ii) Annual interest.

(iii) Principal repayment.

(iv) Outstanding balance.

(7 marks)

b) With the help of examples differentiate between pure and speculative risks.

(5 marks)

c) (i) Given $i = 0.1$ calculate the value of d and v.

ii) Given $d = 0.05$ calculate the value of i and v

iii) Given $v = 0.08$ calculate the value of i and d.

(4 marks)

Question 2

a) The distribution of fire damage to the ware house belonging to Z Company is shown below.

Amount in ksh	Probability
0	0.6
20,000	0.2
80,000	0.1

85,000	0.08
100,000	0.01
160,000	0.01

It is the policy of the company to insure fire risks if premiums charged do not exceed 20% of the expected loss, otherwise the risks are retained.

i)   As a risk manager, advise the company on the course of action with regard to the fire risk if cost for fire insurances is Ksh. 4,000.

ii)   What is the probability of losses exceeding Ksh. 90,000?

(7 marks)

b) What do you understand by the term enterprise risks?

(8 marks)

Section B. (Attempt any 3 questions)

Question 3

(a) The following is an extract from ELT table

Age x	l_x	d_x	Px [T] = x
30	10,000	34.78	-
31	9965.22	38.1	-
32	9927.12	41.76	-
33	9885.35	45.80	-
34	9839.55	50.26	-
35	9789.29	55.17	-
36	9734.12	60.56	-

37	9673.56	66.49	-
38	9607.07	72.99	-
39	9534.08	80.11	-

Complete the Table by calculating for P_X [T] =x for x = 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40 for a randomly selected individual from the age 30.

(5   marks)

(b) Using the table in part (a) calculate the following

Probabilities

(i) Prob [35 dies after 3 years]

(ii) Prob [30 survived for 3 years]

(iii) Prob [36 survived 2 years then dies the following year]

(5 marks)

c)   Define the symbols l_x, d_x and Px

(3 marks)

X **Question 4**

a) Describe the cash flow model for each of the following cases.

i)   Pensions.

ii) Endowment assurance.

iii) Deductibles.

iv) Principle of indemnity.

(8 marks)

b) If 110,000 items shipped by the firm only 110 were damaged in transit. What is the probability of having 0, 1, 2, and 4 damaged items in a sample of 900, items.

(5 marks)

✓ Question 5 Investment in project A and B.

Economic	probability	returns %	
Conditions		A	B
Good	0.5	40	0
Bad	0.5	0	40

a) Calculate the expected rate of return, variance and standards deviation of A.
b) Calculate the expected rate of return, variance and standard deviation of B.
c) Calculate expected portfolio return of A and B.

(6 marks)

d) Differentiate between systematic and unsystematic risks.

(2 marks)

(ii) Suppose Ksh. 10,000 is placed in the saving account of a bank at 10% percent interest rate. Calculate Ac and As at the end of five years and comment on the differences.

(5 marks)

Question 6

(a) The risk free rate of interest is 9%. The market portfolio is expected to yield a return of 20% with standard deviation of 6%. Calculate the expected portfolio rate of return if the standard deviation of portfolio is 5%.

(4 marks)

(b) Let Ac (i,n) and PV (i,n) denote the function for accumulation of amount 1 for n years at the rate of interest i per annum, under compound interest and present value investment model respectively. Determine, in terms of i and n the expression for Ac (i,n) and PV (i,n).

(4 marks)

(c)The following is an extract of ELT table

Ages x	lx	dx
0	1000	200
1	800	150
2	650	100
3	550	150
4	400	100

Find

l_2

$_2P_2$

q_3

(5marks)

7. (a) In tossing a coin 1000 times. Find the probability of obtaining less than 470 heads.

(6 marks)

b) How many years does it take for money to triple in value at interest rates i?

Given t [i=0.05, i=0.07, i=0.1] (4 marks)

c) Define the following symbols d and v. (3 marks).