CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF PROCUREMENT AND LOGISTICS MANAGEMENT

BPLM 102: MANAGEMENT MATHEMATICS

STREAMS: BPLM **TIME: 2 HOURS**

DAY/DATE: MONDAY 05/07/2021 **2.30 P.M. – 4.30 P.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions**

Q1. (a) Using suitable examples, discuss any five different classes of annuities. (10 marks)

(b) A company borrowed Ksh. 200,000 to be repaid in ten years at a compound interest of 12.25%. Calculate the annual repayments necessary to amortize the loan.

(c) In a survey of 200 clients of an insurance company, it was found that:

90 had a life insurance policy
70 had a medical policy
76 had an education policy
36 had life and education policy
30 had life and medical policy
40 had education and medical policies
8 had life, education and medical policies

Required:

(i) Present the information in a venn diagram
(ii) The number of clients worth only policies
(iii) The number of clients without any policy. (10 marks)

2. (a) Using suitable examples, distinguish between a permutation and a combination. (8 marks)

(b) A committee of 8 is to be formed out of 6 accountants, 8 engineers and a lecturer. In how many different ways can the committee be formed if

(i) Any member can be included in the committee. (4 marks)

(ii) The committee should include three accountants and four engineers. (4 marks)

(iii) A lecturer must be included. (4 marks)

3. (a) Give that $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{pmatrix}$ $B = \begin{pmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{pmatrix}$

Calculate (i) AB
(ii) BA (10 marks)

(b) Juma was given Ksh. 1,500,000 as his retirement benefit. He wants to invest the money in fixed bank deposits and has the following options:

Option I: Invest the money in utumish bank for five years at simple interest of 18.5%

Option II: Invest the money in Utawala bank for five years at a compound interest rate of 12.75% p.a.

Required
Advice Juma on the better option of investment. (10 marks)

4. (a) The demand function of a firm is $P = 12 - 3.5Q$ and the average total function is $3 - 0.5Q$ where Q is the quantity sold and P is the price charged in Kenya shillings per unit.

Required

(i) The quantity that maximizes profit. (5 marks)

(ii) The price that maximizes profits. (5 marks)

(b) The fifth term is an Arithmetic progression is 17 and the third term is 11. Calculate the sum of the first seven terms. (5 marks)

(c) Expand $(2x + 3y)^4$ in ascending powers of x. (5 marks)
