CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

CHUKA, EMBU AND THARAKA CAMPUSES

FIRST YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN PROCUREMENT AND LOGISTICS MANAGEMENT, DIPLOMA IN BUSINESS MANAGEMENT AND DIPLOMA IN ACCOUNTANCY

DIBM 0122: BUSINESS MATHEMATICS II

STREAMS: DIAC, DPLM, DIBM Y1S2   **TIME: 2 HOURS**

DAY/DATE: FRIDAY 06/12/2019   **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:
- **Answer question ONE and any other TWO questions.**
- **Do not write on the question paper.**

QUESTION ONE

(a)   Illustrating where possible, distinguish between the following terms as used in matrix;

     (i)   Null matrix and identity matrix   (3 marks)
     (ii)   Column matrix and row matrix   (3 marks)

(b)   In how many years will Ksh. 40,000 deposited in a fixed deposit account grow to Ksh. 50,000 at an interest rate of 10% per annum if the compounding is done semi-annually?   (4 marks)

(c)   Shagazi is an electronics dealer and has discovered that the TV brands, TCL, LG and Vitron in his various outlets within the county have a failure rate of 3%, 6% and 8% respectively.   The average daily sales for the 3 brands comprise of 40% TCL, 30% LG and 30% Vitron brands. On a particular day a TV brand is sold randomly;

     Required:

     (i)   A probability tree diagram to present the above scenario.   (4 marks)

(ii)   The probability that the sold TV brand was defective.   (3 marks)

(iii)   The probability that the sold brand is either TCL or LG.   (2 marks)

(iv)   The probability that the sold brand is LG given that is was found defective.
                                                                              (4 marks)

(d)   XYZ Ltd sales for its two products A and B in its two branches P and Q in the entire year 2018 is given by

$$\begin{array}{cc} & P \quad Q \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 50 & 45 \\ 60 & 70 \end{bmatrix} \end{array}$$

If the sales for the first 3 months are given by $\begin{array}{cc} & P \quad Q \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 30 & 15 \\ 20 & 0 \end{bmatrix} \end{array}$ determine the sales for the last 9 months.   (4 marks)

(e)   Determine the present value of Sh. 50,000 receivable after 5 years if the prevailing discount rate is 18% per annum.   (3 marks)

QUESTION TWO

(a)   Define the following terms as used in probability
       (i)   Sure event   (2 marks)
       (ii)   Random experiment   (2 marks)
       (iii)   Mutually exclusive events   (2 marks)

(b)   Mshirika is a members of Wokovu Sacco that offer loans to its church members. The loan repayment period is 5 years and the interest rate charged in 10% per annum on reducing balance. The annual instalment amount payable is Sh. 5,276.

       Required:

       (i)   The amount of loan the Sacco offers to its members to the nearest thousands.
                                                                        (3 marks)
       (ii)   A loan amortization schedule that would guide Mshirika in loan repayment.
                                                                        (5 marks)

(c)   Discuss the three types of decision making environments in a contemporary business enterprise.   (6 marks)

QUESTION THREE

(a)   A certain audit firm has two categories of employees; Auditors and Assistant auditors. The total monthly salary of 1 auditor and 5 assistant auditors is Sh. 456,755 while that of 3 auditors and 9 assistants is Sh. 985,005.

Required:

(i)   The monthly salary of an auditor and an assistant auditor using matrix algebra.
(5 marks)

(ii)   Given that the firm has a total of 6 auditors and 14 assistant auditors and each employee contributes 12% of his/her monthly salary to their Sacco, determine the total monthly contributions to the Sacco.
(3 marks)

(b)   An economy has two industries, farming (F) and Horse (H). The industries have a technology matrix given by $A = \begin{bmatrix} 0.05 & 0.5 \\ 0.1 & 0 \end{bmatrix}$ and the external demand

$D = \begin{pmatrix} 8,000 \\ 2,000 \end{pmatrix}$ where F and H units are in tonnes and thousand kilometres of horse rides respectively. Determine the gross production for each industry.   (8 marks)

(c)   Aden deposited Ksh. 40,000 at the beginning of each year for 5 years at interest rate of 12% p.a. What was the accumulated amount at the end of the 5th year?   (4 marks)

QUESTION FOUR

(a)   A farmer has an opportunity of planting one of the three crops A, B and C under three rainfall conditions; Low Moderate and High. Below is a payoff matrix in thousand shillings for each crop.

		A	Crop B	C
Rainfall	Low	2,000	4,000	-4,000
	Moderate	1,000	3,000	5,000
	High	-1,000	2,000	8,000

Advise the farmer on the best crop to plant under the following criteria giving reasons for each of your advice.

(i)   Maximax criterion   (2 marks)
(ii)   Hurwicz criterion   (3 marks)
(iii) Savage principle   (3 marks)
(iv)   Laplace criterion   (2 marks)

(b)   A credit committee of 10 members is to be formed from 8 directors, 6 credit officers and the chairperson of the Sacco. In how many possible ways can the committee be formed such that;

(i)   Any eligible member can be included.   (2 marks)

        (ii)   The chairman of the Sacco must be included.   (2 marks)

        (iii)   The chairman and 4 credit officers must be included.   (2 marks)

(c)   Distinguish the following terms as used in financial mathematics:

        (i)   Compounding and discounting.   (2 marks)

        (ii)   Annuity and perpetuity.   (2 marks)