CHUKA   **UNIVERSITY**

RESIT/ SPECIAL EXAMINATIONS

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

DIBM 0122: BUSINESS MATHEMATICS II

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

DAY/DATE: THURSDAY 26/07/2018   **8.30 AM – 10.30 AM**

INSTRUCTIONS:

Answer Question One and any other Two

(a)   Distinguish between closed and open Leontief models; illustrate where possible.
                                                    [4 marks]

(b)   Define the following terms

        (i)   Equiprobable events   [2 marks]
        (ii)   Mutually exclusive events   [2 marks]

(c)   The probability of a student in Chuka University winning an election for faculty student leadership is $\frac{2}{3}$ while that of the same student winning for member of county assembly in Ushaguzi Ward is $\frac{5}{9}$. Given that the probability of winning both seats is $\frac{14}{45}$, what is the probability of winning an election in Ushaguzi ward given that the student has already won in elections of Chuka University?   [4 marks]

(d)   Addi borrowed a loan of ksh 160,000 from a bank whose interest rate was 10% p.a and the repayment period was 4 years.

        (i)   Determine the annual installment amount payable   [3 marks]

        (ii)   Prepare the respective loan amortization schedule that would aid Abdi in repayment of the loan.   [5 marks]

(e)   Use the Cramer's rule to find the unknown in the following system of linear equations
$$x_1 - x_2 + 5x_3 = -6$$
$$3x_1 + 3x_2 - x_3 = 10$$
$$x_1 + 3x_2 + 2x_3 = 5$$

(f)   Differentiate between mutually exclusive events and independent events.   [3 marks]

Question Two

(a)   The following table gives the Input-output coefficient for three sector economy consisting of Agriculture, Mining and Banking
Input-output coefficient

From	To		
	Agriculture	Mining	Banking
Agriculture	0.3	0.4	0.2
Mining	0.2	0.0	0.5
Banking	0.1	0.3	0.1

The projected demand for the three sectors Agriculture, Mining and banking are 100, 40 and 50 million shillings respectively;

(i)   Determine the technology matrix   [2 marks]

(ii)   Determine the gross output of each of the three sectors that will meet this demand.
                                                                                    [8 marks]

(b)   A student in Chuka University borrowed money for his fees from a local bank at 12 ½ of p.a compounded semi-annually for three years. If the total amount he will pay is sh. 59,500. Find the borrowed amount.   [4 marks]

(c)   How long will it take for any amount invested at 20% interest rate per annum compounded annually to double its value?   [3 marks]

(d)   Use the matrix method to solve the following system of linear equations.   [3 marks]

$$2x - 3y = 12$$
$$3x - 2y = 13$$

Question Three

(a)   KAY ltd is considering investing in one of three alternative investment opportunities A, B and C under uncertain economic conditions. The conditional payoffs (in ksh '000') for each action –event combination are given below

		Economic conditions	
	E_1	E_2	E_3
	Ksh. '000'	Ksh. '000'	Ksh.'000'
Investment A	4000	4000	4000
B	-2000	2000	6000
C	7000	4000	2000

Determine which alternative investment should the firm choose if it adopts the

(i)   Max-max criterion   [2 marks]
(ii)   Max-min criterion   [2 marks]
(iii)   Savage principle   [3 marks]
(iv)   Hurwicz criterion given $\alpha=0.3$ [2 marks]
(v)   Laplace criterion   [2 marks]

(b)   A man deposited ksh 15,000 into a bank account every year for a period of twelve years. If the bank pays compound interest at the rate of 10.75% p.a, calculate the amount of funds in the bank account at the end of the period.   [5 marks]

(c)   A business borrows ksh. 50,000 for expansion at 12% p.a compounded annually. How much interest will business pay?   [5 marks]

Question Four

(a)   Decision making in a business involves a process that is done in orderly stages. Discuss the stages.   [5 marks]

(b)   In Chuka University, three clerks are assigned to process incoming mails. The first clerk, B, processes 40 percent, the second clerk, B2, processes 35 percent and the third clerk, B3, processes 25 percent of the mail. The first clerk has an error rate of 0.04, the second has an error rate of 0.06 and the third has an error rate of 0.03. a mail selected at random from a day's output is found to have an error. The post master wishes to know the probability that the mail processed by the first, second or third clerk respectively.
                                                                        [10 marks]

(c)   Discuss any three limitations of the input output model.   [3 marks]

(d)   Explain the meaning of the terms "sample space".   [2 marks]