

CHUKA



UNIVERSITY

UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMINATIONS.

IGEMBE CAMPUS

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: DIBM, DPLM and DIAC

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 12/09/2018

8.30 A.M - 10.30 P.M

**INSTRUCTIONS;**

- Answer question ONE and any other two questions
- Do not write on the question paper

**QUESTION ONE**

- a) Define the following terms as used in probability theory
- i. Equiprobable events [2 Marks]
  - ii. Dependent events [2 Marks]
  - iii. Random experiment [2 Marks]
  - iv. Sample space [2 Marks]
- b) Given that matrix  $A = \begin{pmatrix} 1 & 2 & 4 \\ 2 & 3 & 1 \\ 4 & 1 & 5 \end{pmatrix}$  find its determinant [4 Marks]
- c) Keziah borrowed a loan of ksh. 20,000 from a SACCO whose interest rate per annum is 10% Per annum. Given that the loan was repayable in 4 years;
- i. Determine the annual installment amount payable [3 Marks]
  - ii. Prepare the respective loan amortization schedule [5 Marks]
- d) Discuss three types of decision making environment [6 Marks]
- e) A bag contains 5 white and 8 black balls. Two balls are drawn at random from the bag one at a time with replacement. find the probability that both ball are white (Hint: use probability tree) [4 Marks]

**QUESTION TWO**

- a) Use crammers rule to determine the value of unknowns in the following simultaneous equations

$$x - y + 5z = -6$$

$$3x + 3y - z = 10$$

$$x + 3y + 2z = 5$$

[8 Marks]

- b) The management of Changarawe ltd is considering investment in three alternative opportunities A, B and C under uncertain economic conditions; Booms, Recession and Recovery. The conditional payoffs in million shillings are as shown below.

Opportunity (strategy)

	A	B	C
Boom	70	50	30
Recession	30	15	30
Recovery	15	0	30

Required: Determine the optimal opportunity under each of the following decision criterion;

- (i) Maximincriterion [3 Marks]
- (ii) Maximaxcriterion [2 Marks]
- (iii) Laplace criterion [2 Marks]
- (iv) Hurwiczcriterion given  $\alpha=0.7$  [3 Marks]
- (v) Savage principle (minimax regret) criterion [3 Marks]

**QUESTION THREE**

- a) A container has 5 oranges, 4 lemons and 3 avocados. Two fruits are drawn at random one after the other without replacement.

**Required;**

- i. Draw a tree diagram representing the above scenario [5 Marks]
- ii. Determine the probability of picking a lemon on the first draw and an avocado on the second draw [2 Marks]
- iii. What is the probability of picking lemons on both draws? [2 Marks]
- iv. What is the probability of picking an orange and an avocado? [3 Marks]

- b) Omondi invested Ksh. 20,000 for 3 years at an interest rate of 10% per annum compounded quarterly. How much money did he receive at the end of the third year? [4 Marks]

- c) Distinguish between open and closed Leontief models (Illustrate where possible) [4 Marks]

**QUESTION FOUR**

- a) An economy has 2 industries  $T_1$  and  $T_2$ . The industries have the following technology matrix

$$A = \begin{pmatrix} 0.1 & 0.2 \\ 0.2 & 0.4 \end{pmatrix} .$$

If the final demand  $D = \begin{pmatrix} 30 \\ 70 \end{pmatrix}$ , where the units are measured in tonnes, find the gross production for each industry. [8 Marks]

- b) Kiamsha restaurant sell beverages as follows;  
2 cups of tea, 3 glasses of wine and a bottle of soda for Ksh. 162  
3 cups of tea, 4 glasses of wine and 2 bottles of soda for Ksh. 232  
A cup of tea, 2 glasses of wine and a bottle of soda for Ksh. 110

**Required:**

Formulate the respective simultaneous equations representing the sales and hence form a matrix [6 Marks]

- c) A manufacturer knows that if  $X$  eggs are demanded in a particular week the total cost function will be  $TC = 14 + 3x$  while the total revenue function will be  $TR = 19x - 2x^2$ .

Required;

- i. Derive the total profit function [3 Marks]  
ii. Determine the breakeven point [3 Marks]
- .....