



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATION
2021/2022 ACADEMIC YEAR
FIRST YEAR SEMESTER TWO
MAIN EXAMINATION
FOR THE DEGREE OF

**BACHELOR OF COMMERCE / BACHELOR OF BUSINESS
MANAGEMENT AND BACHELOR OF COOPERATIVE AND
ENTREPRENEURSHIP MANAGEMENT.**

COURSE CODE: BCO 122/BBM 123/BCO 125

COURSE TITLE: BUSINESS MATHEMATICS

DATE: 18TH MAY, 2022

TIME: 2.00PM – 4.00PM

INSTRUCTIONS TO CANDIDATES

1. Answer Question One in Section A and Any other TWO (2) Questions in Section B
2. Question one carries 30 marks and each of the other two questions carry 20 marks each.

TIME: 2 Hours

KIBU observes ZERO tolerance to examination cheating

SECTION A (COMPULSORY)

QUESTION ONE

- a) Differentiate between the following pairs of terms as used in business mathematics.

I) Simple interest and compound interest

II) Amortization and sinking fund (4mks)

- b) If $f(x) = 4x^2 - 3x + 5$, for what values of x is $3f(x) = f(3x)$? (3mks)

- c) Solve

$$x + y = 9$$

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{2}$$

(3mks)

- d) The total cost function C and the total revenue function R of a company are given by

$C = 50 + 3x$ and $R = 30x - 0.5x^2$ where x is the output. Find the output at which profit is 50 units. (4mks)

- e) The demand for a certain product is 40 units when the unit price is sh 10 and 48 units when the unit price is sh 8.

i) Derive a linear demand function for the product.

ii) Compute the unit price that will correspond to demand of 16 units. (3mks)

- f) Let $A = \{2, 3, 4, 5\}$, $B = \{3, 6, 9\}$ and $C = \{5, 6, 7, 8\}$. Find;

i) $(A \cup B) \cap (B \cup C)$

(2mks)

ii) $A \cap (B \cup C)$

(2mks)

- g) At what percent will sh 6,000 amount to sh 7,500 in 4 years compound interest? 3mks

- h) Outline three assumptions of linear programming. 3mks

- i) Solve the following equations by gauss Jordan elimination method

$$3x - 5y = 7$$

$$4x + y = 17$$

3mks.

(Total 30marks)

QUESTION TWO

- a) The compound interest on a certain sum of money for two years is ksh 920.25 and the simple interest is ksh 900. Find the sum and the rate of interest. 10mks
- b) A certain sum of money invested on compound interest amounts to ksh 2,420 in 2 years and ksh 2,662 in 3 years. Find the rate of interest and the sum invested. 10mks

(Total 20marks)

QUESTION THREE

- a) Write short notes under the following sub headings as used in set theory.
- I) Finite set (2Marks)
 - II) Equality of sets (2Marks)
 - III) Null set (2Marks)
 - IV) Universal set (2Marks)
 - V) Complement of a set (2Marks)
- b) Of the 100 boarders in a hostel, 80 drink tea, 40 drink coffee and 25 drink both tea and coffee. How many drink neither tea nor coffee? (5mks)
- c) Of the 20 girls in a class, 16 play hockey, 12 play tennis and 4 play basketball. Every girl plays at least one game and two plays all the three games. How many girls play two and only two games? (5mks)

(Total 20marks)

QUESTION FOUR

- a) Solve the following systems of linear equations using crammers rule

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

$$2x-3y-z=-3$$

$$X+2y+z=4$$

10mks

- b) Find the demand vector which is consistent with the input-output matrix

$$A = \begin{pmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.2 \\ 0.1 & 0.3 & 0.2 \end{pmatrix} \quad \text{and the output vector } X = \begin{pmatrix} 25 \\ 21 \\ 18 \end{pmatrix}$$

10mks

(Total 20marks)

QUESTION FIVE

- a) Jane Mbevi intends to borrow sh 600,000 from a bank. The bank has offered to lend her the money at an interest rate of 10% per annum repayable in four annual installments.

Required:

- i) The annual payment necessary to amortize the loan. 6mks
ii) Loan amortization schedule for Jane mbevi. 4mks
- b) Tom lent sh 10,000 to two persons in two parts. The first man borrowed at 5% simple interest and the second man borrowed at 6% simple interest per annum. If Tom receives sh 12,240 as total amount after 4 years, what sum was borrowed by each of the persons? 10mks

(Total 20marks)