



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATION
2021/2022 ACADEMIC YEAR
FIRST YEAR SEMESTER TWO
SPECIAL/SUPPLEMENTARY 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 JULY, 2022

TIME: 11.00AM – 1.00PM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other Two Questions

TIME: 2 Hours

KIBU observes ZERO tolerance to examination cheating

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
- $$2x + 3y = 1$$
- $$x^2 - xy = 6$$
- 3mks
- d) A radio manufacturer finds that he can sell x radios per week at ksh p each where
- $$p = 2(100 - 0.25x)$$
- His cost of production of x radios per week is ksh $(120x + 0.5x^2)$. Find the number of radios to be produced and sold in a week to yield a profit of ksh 1,600. 4mks
- e) The production (P) of a firm for a commodity is $P = 15K + 2LK - L^2 - 0.5K^2$ where L and K denote Labor and Capital respectively. The relationship between L and K is $L + K = 4$. If production is 11.5 units, find labor units. 4mks
- 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) A man lends ksh 1,800 to two persons at the rate of 4% and 4.5% simple interest per annum respectively. At the end of 6 years, he receives ksh 462 from them. How much did he lend to both of them? 3mks
- h) Outline three limitations of linear programming. 3mks
- i) Let $A = \begin{pmatrix} 2 & 2 \\ 3 & -3 \end{pmatrix}$
- Find the inverse of matrix A . 2mks.

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

QUESTION THREE

- a) Write short notes under the following sub headings as used in set theory.
- I) Subset of a set
 - II) Equality of sets
 - III) Disjoint sets
 - IV) Universal set
 - V) Complement of a set
- 10mks
- 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) In a group of 50 people, 35 speak Hindi, 25 speak both English and Hindi and all the people speak at least one of the two languages.
- I) How many people speak only English and not Hindi? 2mks
 - II) How many people speak English? 3mks

QUESTION FOUR

- a) Solve the following systems of linear equations using Gauss-Jordan elimination method.

$$X+2y-3z=-4$$

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

$$3x-3y-4z=11$$

10mks

- b) Consider an economy consisting of three sectors: Agriculture, Manufacturing and services. The hypothetical flow of goods and services in physical units is summarized in the following table.

	Agriculture	Manufacturing	Services	Final demand
Agriculture	60	180	0	120
Manufacturing	30	60	30	180
Services	0	40	10	100

If the demand changes to (150 160 180), what should be the new output?

10mks

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