(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATION

2021/2022 ACADEMIC YEAR

FIRST YEAR SEMESTER TWO

SUPPLEMENTARY EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: BCO 122/BCO123/BCO214

COURSE TITLE: BUSINESS MATHEMATICS

DATE: 17TH JANUARY,2022 **TIME**2.00PM – 4.00PM

INSTRUCTIONS TO CANDIDATES

Answer Question **One** and Any other **Two** Questions

TIME: 2 Hours

KIBU observes ZERO tolerance to examination cheating

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QUESTION ONE

a) State two types of costs and give one example in each case. 4mks

b) If $f(x)= x^2 -3x + 4$, find the values of:

i) f(3)

ii) f(-5) 4mks

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

d) Determine how long it would take in years for given sum of money to double itself at 8% compound interest per annum. 4mks

e) A television manufacturer found that the total cost of producing and selling x television sets is given by C(x) = 50x2+3000x+43750. Each set is sold for sh 6, 000. Determine the breakeven points. 3mks

f) The population growth of a country was 200 million the year 2000. It has since grown at 4% per annum. The growth rate is exponential of the form $P=ae^{kt}$ Where t=time, p= population, k= growth rate and a is a constant.

i) Determine function which describes population growth through time. 2mks

ii) Estimate the population in the year 2015. 2mks

g) 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

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

i) Define the following terms as used in set theory.

i) Universal set

ii) Complement of a set 2mks

QUESTION TWO

Let $A = \begin{pmatrix} 2 & 2 \\ 3 & -3 \end{pmatrix}$

a) Find A^2 and A^3

4mks

b) If $F(x) = x^3 - 3x^2 - 2x + 4I$
Find F (A) 4mks

c) Find the inverse of matrix A 4mks

d) A simple hypothetical economy of three industries A, B and C is represented in the following table (data in millions of shillings).

User / Producer	A	B	C	Final Demand	Total Output
A	80	100	100	40	320
B	80	200	60	60	400
C	80	100	100	20	300

Determine the output vector for the economy if the final demand changes to 60 for A, 60 for B and 60 for C.

8mks

QUESTION THREE

a) Write brief notes on the following as used in set theory.

(i) Finite set

(ii) Sub-set

(iii) Equality of sets 6mks

b) The main daily newspapers in Nyeka town are : The National, The New Era and the Citizen. The management of one of the dailies is concerned about the low sales volume of their paper. In a recent survey of 100 families in Nyeka town , the numbers that read the various newspapers were found to be as follows:

Newspaper	number of readers
The citizen	28
Citizen and Era	8
The Era	30
Citizen and National	10
The National	42
New Era and National	5
All the three papers	3

Required:

(i) A venn diagram to represent the above information. 4mks

(ii) The number of families who do not read any of the three papers. 4mks

(iii) Mrembo Beauty advertising firm in Nyeka town want to know which newspaper they should advertise in so that they can reach the largest audience. Advise the firm. 6mks

QUESTION FOUR

a) A loan of sh 1000 is paid in 5 equal annual payments interest being at 6% per annum compound interest and first payment being made after a year.

(i) Calculate

Required:

(i) The annual payment necessary to amortize the loan. 5mks

i) Loan amortization schedule. 5mks

b)