(36)

(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATION

2020/2021 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER

SPECIAL/SUPPLEMENTARY EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: BCO 122

COURSE TITLE: **BUSINESS MATHEMATICS**

DATE: 1ST FEBRUARY,2021 **TIME:** 8.00 - 10.00

INSTRUCTIONS TO CANDIDATES

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

TIME: 2 Hours

KIBU observes ZERO tolerance to examination cheating

QUESTION ONE

a) Distinguish between the following pairs of terms as used in business mathematics.
   i) Simple interest and compound interest. 2mks
   ii) Amortization and sinking fund. 2mks

b) The relationship between price (X) and quantity demanded (Y) for an article is given by the function Y=16-4X. Determine the domain and range of the function. 4mks

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

d) A sum of sh 5,000 was invested in an account at 9% interest compounded yearly. After how many years will the sum be sh 8,000? 3mks

e) The cost function C(x) of producing x units of a product is given by $C(x) = 400x2+2200x+4800$. If each unit of the product is sold at sh 5,000, determine the breakeven points. 4mks

f) The resale value V of a certain piece of industrial equipment was found to be exponential in nature and was described by the function $V=100e^{-0.1t}$. Where t=time.
   i) Determine its value when t=0 2mks
   ii) What is the expected resale value after 15 years? 2mks

g) Use gauss-Jordan elimination to solve the following pairs of simultaneous equations.
   2X+Y=8
   3X-2Y=-2 3mks

h) Outline three advantages of linear programming. 3mks

i) Define the following terms as used in set theory.
   i) Union of sets
   ii) Intersection of sets 2mks

QUESTION TWO

a) The management of a printing firm is in the process of acquiring a new printing machine due to obsolescence of the existing machines. The new machine can be acquired from two sources, A and B with different financing arrangements. The new machine costs sh 1,800,000.

Source A:

Buying a new machine from a seller charging 20% simple interest for 3 years on the cost of the machine.

Source B:

Buying a new machine from a seller charging 10% compound interest for 2 years payable semi-annually on the cost of the machine.

Required:

i) Advice the management of the printing firm on the best financing arrangement for acquiring the new machine. 10mks

ii) The number of years the firm would take to pay for the new machine under the cheaper option in (i) above if interest is charged at the rate of 5 % compounded annually. 5mks

b) 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. 5mks

QUESTION THREE

a) Njoki, Atieno and Mwema are green grocers based inNairobi. Recently, the three travelled to Molo town to purchase potatoes, tomatoes and Mangoes for sale.

Njoki purchased 2 bags of poataoes, 6 boxes of tomatoes and 5 bags of mangoes at a total cost of sh 20,200. Atieno purchased 10 bags of potatoes, 4 boxes of tomatoes and 1 bag of mangoes at a total cost of sh 21,800. Mwema purchased 1 bag of potatoes, 7 boxes of tomatoes and 6 bags of mangoes at a total cost of sh 21,900.

The transportation cost of the groceries from Molo town to Nairobi was sh 100 per bag of potatoes, sh 150 per box of tomatoes and sh 120 per bag of mangoes. The grocers sold the groceries at sh 1,800 per bag of potatoes, sh 1,600 per box of tomatoes and sh 2,500 per bag of mangoes.

Required:

i) The unit cost price of each type of grocery using crammers rule. 6mks

ii)The total profit earned by the three grocers. Assume that no additional cost was incurred by the grocers. 6mks

b) MwanaishaJuma invested sh 1,000,000 in two investment funds A and B at simple interest of 9.5% per annum and 11% per annum respectively. Her total interest earned from the two investments over a one year period was sh 103,850. Determine the amount of money MwanaishaJuma invested in each investment fund. 8mks

QUESTION FOUR

a) Janet odhiambo 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) Loan amortization schedule for Janet Odhiambo. 8mks

ii) suppose the terms of the loan were that Janet Odhiambo was to make annual repayments of sh 60,000. Determine how long it would take her to rapay the loan in full. 6mks

b) Determine how long it would take in years for given sum of money to double itself at 8% compound interest per annum. 6mks