PAN AFRICA CHRISTIAN UNIVERSITY

BACHELORS OF COMMERCE

END OF TERM EXAMINATION

DEPARTMENT: BUSINESS

COURSE CODE: BCM 102/BIT 102/BUS2123

COURSE TITLE: BUSINESS MATHEMATICS

EXAM DATE:

TIME:

INSTRUCTIONS

- Read all questions carefully before attempting.
- Question **One** is **compulsory** i.e Section **A** is **compulsory**
- Answer any **THREE** Questions in Section **B**
- Write your **student number** on the answer booklet provided.

SECTION A: COMPULSORY

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QUESTION ONE

a) A certain company produces 20 units of Product P and 40 units of Product Q at a total cost of Shs. 10,800 in the month of March 2020. The company also produced 30 units of Product P and 25 Units of Product Q at the total cost of Shs 9,200. In the month of April 2020.

Required

Using matrix algebra, calculate the cost of producing one unit to Product P and one unit of Product Q. (4 Marks)

b) A businessman acquired a second hand Pick-up at a cost of Shs. 2,100,000. The estimated useful life of the pick–up is 5 years and it's scrap value was Shs.600.000

Required

i. Determine the annual depreciation (2 Marks)

ii. Determine the book value after 4 years (2 Marks)

c) Use elimination method to solve the following equation

$4x + 3y = 26$

$2x – y = 8$

(2 Marks)

SECTION B: CHOOSE ANY THREE QUESTIONS

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QUESTION TWO

Kwamboka deposited money in a fixed deposit account that pays interest at the rate of 10% per annum for 5 years. She also deposited a certain amount of money in an investment account that pays interest at the rate of 15% per annum for the same period.

At the end of 5 years, Kwamboka received Shs. 31,285 and Shs. 68,070 from the fixed deposit account and the investment account respectively.

Required

Determine the amount of money invested in each account based on:

i. Simple interest. (4 Marks)
ii. Compound interest. Assume interest was compounded quarterly. (6 Marks)

QUESTION THREE

a) A sales man earns a commission of 6% on sales of cement and 10% on sales of iron sheets. The selling price of a bag of cement is Shs. 700 while that of iron sheet is Shs. 1,500. During the month of August 2023, the number of bags of cement sold by the salesman was more than the number of iron sheets sold by 80. The salesman received a total commission of Shs 76,320 in the month of August 2023.

Required

i. The number of bags and iron sheets sold in the month of August 2023. (4 Marks)
ii. The commission received on the sale of both cement and iron sheets. (2 Marks)

b) A businessman acquired a second-hand pick up a cost of Shs. 1,500,000. The estimated useful life of the pickup was 5 years and its scrap value Shs. 300,000.

Required

i. Calculate the annual rate of depreciation in percentage (2 Marks)

ii. Calculate the net book value of the pickup after the third year (2 Marks)

QUESTION FOUR

a) Solve the following equation using matrices

$4x + 2y - 2z = 10$

$2x + 8y + 4z = 32$

$30x + 12y - 4z = 24$ (6 Marks)

b) Consider a commodity with the following demand and supply equations

$Qs = -5 + 2P$

$Qd = 10 - p$

Determine the equilibrium price and equilibrium quantity. (4 Marks)

QUESTION FIVE

a) The 8^{th} term of an arithmetic series is 57 and the 17^{th} term is 111.

Required

i. Determine the common difference (2 Marks)

ii. The first term (2 Marks)

iii. The sum of the first 28 terms (2 Marks)

b) The 10^{th} term of a geometric progression is 177,147 and the 6^{th} term of the series is 2,187.

Required

i. The common ratio (2 Marks)

ii. The value of the first term (2 Marks)

QUESTION SIX

a) Dena Ltd offered credit to individuals who wish to buy cars. Anderson Charo wishes to acquire a car and approached Dena Ltd. The terms of the sale for the car are Shs 4,425,000

cash or Shs. 1,800,000 deposit and Shs 195,000 per month for 2 Months. Dena Ltd can repossess the car in case Anderson Charo is unable to pay all monthly instalments.

Required

i. The hire purchase price of the car (3 Marks)

ii. The compound interest rate at which Shs.4, 425,000 can be invested for 20 months to yield the hire purchase price of the car. (4 Marks)

b) Solve the following simultaneous equation using elimination method

$4x + 3y = 7$

$3x - 2y = 9$ (3 Marks)