
CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD DEGREE OF
BACHELOR OF COMMERCE**

BCOM 161: BUSINESS MATHEMATICS 1

STREAMS: BCOM Y1 S1

TIME: 2 HOURS

DAY/DATE: THURSDAY 9/04/2020

2.30 P.M - 4.30 P.M.

INSTRUCTIONS

1. Answer questions **ONE** and any other **TWO** questions.
2. Do not write on the question paper

QUESTION ONE

- a) Define the following terms as used in business mathematics
 - i. Intersection of sets [2 Marks]
 - ii. Finite set [2 Marks]
 - iii. Ordinary annuity [2 Marks]
 - iv. Simple interest [2 Marks]

- b) Abdi deposited Sh.25,000 in a fixed deposit account at a compound interest of 12% per annum compounded quarterly. Determine the:
 - i) Accumulated amount to the nearest thousands after 4 years. [3 Marks]
 - ii) The time it will take for the amount to grow to Sh.54,000 [5 Marks]

- c) The monthly number of balls produced by a Firm follows an arithmetic progression. The total number of balls produced in the first 4 and 8 months are 1,270 and 3,260 respectively. Determine the number of balls produced in the 10th month. [6 Marks]

- d) The value (V) of an investment had been found to behave according to the function:
 $V = 200,000e^{0.2t}$; where t is time in years
- i. What was the initial investment amount? [2 Marks]
 - ii. What would be the value of the investment after 5 years [2 Marks]
 - iii. How long will it take for the value of the investment to double? [4 Marks]

QUESTION TWO

- a) The relationship between total cost and output in XYZ Ltd was found to be linear. It would cost shs.5,350 to produce 2,000 units and shs.6,100 to produce 2,500 units in a week. What are the variable costs and fixed weekly costs of production? [5 Marks]
- b) A firm that produces a single product has fixed cost of Sh.600,000 per month and a variable cost of Sh.40 per unit. It sells its product at a price of Sh.100 per unit and the firm is able to sell all units produced in a particular month.
 - (i) Find the break-even level of monthly output. [3Marks]
 - (ii) If the firm is making a loss of Sh.120,000 per month, what increase in production would be required to break even? [5 Marks]
- c) Given that A, B and C are subsets of the universal set U is an integer less than 10 but greater than 0} and that $A = \{1,2,4,6,7,9\}$, $B = \{2,3,5,8,9\}$ and $C = \{1,3,4,5,6,8,9\}$. Determine the composition of the following sets;
 - i. $A \cap B \cap C$ [2 Marks]
 - ii. $A - (A \cap C)$ [3 Marks]
 - iii. $n\{A \cup B \cap C\}$ [2 Marks]

QUESTION THREE

a) Juma wish to have Kshs.8,000,000 at the end of the 15th year. To accumulate this sum he decides to save in a bank a certain amount at the end of each year for the next fifteen years. If the bank pays 10 per cent per annum interest, how much should he save each year? [4 Marks]

b) Chuka Daily distributes three types of magazines namely; Newline (N), Informer (i) and update (U). The management is intending to expand its market to Meru county hence recently conducted a market survey to determine the magazine preferences among 100 households in Meru town. The following results were obtained from the survey.

48 households read the Newline magazine.

18 households read the Informer magazine.

26 households read the Update magazine.

8 households read the Newline and update magazines.

8 households read the Newline and the Informer magazines.

3 households read the Update and the Informer magazines.

24 households read none of the three magazines.

Required; Clearly showing your working;

i) Present this information on a venn diagram [3 Marks]

ii) Determine the number of households who read all the 3 magazines [3 Marks]

iii) How many households read exactly one magazine [2 marks]

iv) How many households read Newline but not Informer [2 Marks]

c) Use the binomial theorem to find the first three terms in ascending powers of of and hence use your expansion to estimate the value of $(0.992)^4$ [6 Marks]

QUESTION FOUR

a) The management of the Titan Tire Company has determined that the weekly demand and supply functions for their Super Titan tires are given by:
respectively, where p is measured price in shillings and q is hundreds of units produced and sold. Determine the equilibrium quantity and price.

[6 Marks]

b) AUSA Sacco provides low cost retail lending services. Maria wishes to borrow a loan at the prevailing interest rate of 9% per annum on reducing balance method. The loan is to be repaid in equal annual installments of sh.1,285.40. Determine

(i) The amount of loan a client can borrow (To the nearest whole number)

[3 Marks]

(ii) Prepare the respective loan amortization schedule that would guide Maria in loan repayment.

[5 Marks]

c) A wedding committee of 5 members is to be constituted from among 5 youths, 3 church elders and the pastor. In how many ways can the committee be formed such that:

(i) No restriction on who is to be included among the 9 members [2 Marks]

(ii) The Pastor must be included [2 Marks]

(iii) The Pastor and 2 youths must be included [2 Marks]

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