



MAASA MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS
BACHELOR OF COMMERCE; BSC.PROJECT
PLANNING & MGT, BSC.ENTREPRENEURSHIP**

COURSE CODE: BCM1108

COURSE TITLE: BUSINESS MATHEMATICS ONE

DATE: 15TH DECEMBER 2022

TIME: 1100-1300

INSTRUCTIONS:

Attempt Question One and Any Other Two Questions: Clear Examples, Calculations and Explanations Are Awarded

Do Not Write On the Exam Question Paper.

SECTION A(COMPULSORY)

QUESTION ONE

- a. Define calculus and state its importance in business management **(6 marks)**
- b. The demand and total cost function for a firm are given by:
 $p=7-0.4q$ and $TC = 4/7q^3-3/4q^2 - 7q + 5$ respectively
 p = price (in Kshs) per unit
 q = quantity demanded (in units)
 $T.C$ =Total cost (kshs)

Required:

- (i) The level of q and p that will maximize profits **(6 marks)**
- (ii) The level of q that will maximize total revenue **(3 marks)**
- (iii) The level of q that will maximize average variable cost **(3 marks)**
- N.B In each case, check the second order condition
- c. With explanations which four areas would you use exponential functions in kenyas' economy today **(2 marks)**

SECTION B: ATTEMPT ANY TWO QUESTIONS

QUESTION TWO

- a) State any three reasons why the study of sets is popular in business and economic word **(3 marks)**
- b) In a bid to advice families on healthy feeding habits, a business researcher conducted a survey of 500 households in Nairobi county and unveiled the following results concerning the most preferred foods which were Ugali (U), Rice (R) or Potatoes (P):

160 households preferred Ugali
100 households preferred rice
225 households preferred potatoes
70 preferred Ugali and rice
40 preferred rice and potatoes
50 preferred Ugali and potatoes
150 households fed on none of the three types of foods

Required

- (i) Present the above information in a Venn diagram. **(4 marks)**
- (ii) Determine the number of households which fed on
- All the three types of food. **(4marks)**
 - At most two types of foods **(4 marks)**

QUESTION THREE

- a) Define the following terms as used in linear cost- volume- profit-analysis:
- (i) Contribution margin per unit (CMU) (2 mark)
 - (ii) Margin of safety (2 mark)

b) A company manufactures and sells two products, X and Y. The following data relates to the same

	Product X	Product Y
Sales (in units)	80,000	20,000
CMU	Kshs 4	Kshs 5
Unit variable cost	Kshs 8	Kshs 3

Required:

At what annual fixed costs would the Break- Even revenue be exactly Kshs 819,000 and Kshs 436,800 for products X and Y respectively? (5 MARKS)

- c) The following data has been extracted from the records of Fifty plus one (FPO) Company Ltd by a first year B. Com student

Time (t) – years	-20	-5	0	10	20
Profit (π) – Kshs	900	0	-100	0	500

Required

- i) Determine the function $\pi = f(t)$ in the form stated in above (4 MARKS)
- ii) Project the value of π , when $t = 1$ (1 MARKS)
- iii) At what value of t is $\pi = - 108$? (1 MARKS)

QUESTION FOUR

- a) How would you guide an organization in applying polynomial functions?(4 MARKS)
- b) Solve the following simultaneous equations when demand is equals to supply for product X and Y ;(market equilibrium), given that: demand for product X is $Qdx = 2000 - 2p1 + 3p2$ and $qsx = 2p1 - 8$ whereas for product Y is $qdy = 3000 + 4p1 - p2Q$ and $qsy = 3p2 - 8$ respectively. Show clear calculations.

(7 MARKS)

- c) Verify results in (b) above and explain the market equilibrium. (4 MARKS).

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