



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2016/2017

**FIRST YEAR SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF BUSINESS
ADMINISTRATION (BUSINESS STUDIES)
AGRIBUSINESS MANAGEMENT, EDUCATION AND BA
(ECONOMICS) WITH INFORMATION TECHNOLOGY**

MAIN CAMPUS

ABA 107: MANAGEMENT MATHEMATICS I

Date: 13th June, 2017

Time: 12.00 - 3.00pm

INSTRUCTIONS:

- Answer Question ONE and any other THREE.
- Question one carries 25 marks and the rest 15 marks each



QUESTION ONE (25 MARKS)

- a) define the following terms as used in set theory and functions: (3 marks)
- Set cardinality
 - Infinite sets
 - Null set
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- b) If $U =$ (positive integers), $P =$ (multiple of 4 less than 50) and $Q =$ (multiple of 6 less than 50). (4 marks)
- List P and Q
 - Find $P \cap Q$
 - Find $P \cup Q$
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- c) Explain the meaning of simple interest as used in management mathematics (2marks)
- d) Solve the following system equation using substitution method (4marks)
- $$2y = -3x + 1$$
- $$4 = x + 5y$$
- e) How long does it take for Ksh 900,000 to accumulate to Ksh 1,000,000 under an interest rate of 4% p.a.? (4 marks)
- f) A company manufactures plasma LCD television that sells to retailers for ksh 5500. The cost of marking x of these TVs for a month is given by the cost function $C(x) = 2500x + 2130,000$. (5marks)
- Find the function R that gives the revenue for selling x TV's
 - What is the revenue for selling 1300 TV's
 - Find the profit function hence find the profit from selling 700 TV's
- g) Differentiate between linear and nonlinear functions (3 marks)

QUESTION TWO (15 MARKS)

- a) Define the following terms: (4 marks)
- Annuity
 - Net Present Value
 - Average Rate of Return
 - Discounting
- b) Calculate the simple interest earned over 5 years if Ksh 1,640 is invested at a rate of interest of 9 per cent per annum? (2 marks)
- c) The interest quoted to a small business for a short term loan of 1 year is 2.5 percent per month. What is the Annual Percentage Rate? (3 marks)
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- d) A sole trader wishes to purchase a vehicle for the business and is quoted an annual percentage rate of interest of 20% on a loan of Ksh 120,000 over 3 years. Calculate: (3 marks)
- The interest paid on the loan

- ii) The total cost of the loan if repayment is made over $2\frac{1}{2}$ years at the monthly equivalent interest of 1.73 per cent. (3 marks)

QUESTION THREE (15 MARKS)

- a) Suppose that we have the set $U = \{n: 1 \leq n < 100\}$ of whole numbers as our universal set. Let P be the prime numbers in U , let E be the even numbers in U , and let $F = \{1, 2, 3, 5, 8, 13, 21, 34, 55, 89\}$. State;

- i) E^c
- ii) $P \cap F$
- iii) $P \cap E$
- iv) $F \cap E \cup F \cap E^c$
- v) $F \cup F^c$ (10 marks)

- b) Assume that company Y wants to invest in two mutually exclusive projects of Ksh 10,000 each generating the following cash flows

Year	A	B
1	5000	1000
2	4000	2000
3	3000	3000
4	4000	4000
5	-	5000
6	-	6000

- Using payback period, advice the company which project to invest in (5 marks)

QUESTION FOUR (15 MARKS)

- a) A city has three newspapers A, B and C. of the adult population, 1% read none of these newspapers. 36% reads A, 40% reads B, 52% reads C, 8% reads A and B, 11% reads B and C, 13% read A and C and 3% reads all the three newspapers what percent of the adult population read:
- i. Newspaper A only
 - ii. Newspaper B or Newspaper C
 - iii. Newspaper A or B but not C (8 marks)

- b) Two major investment projects each have the same initial capital outlay of Ksh 1 million. The expected net revenues on the respective projects over the next four years are outlined below (million):

	Project A	Project B
Year 0	-1,000	-1,000
Year 1	400	400
Year 2	500	400
Year 3	350	400
Year 4	300	400

Calculate the Net Present Value for the respective projects using a 0.10 (10 percent) rate of discount. Set out your answer in the form of a discounted cash flow table. (7 marks)

QUESTION FIVE (15 MARKS)

- a) What is the present value of receiving Ksh2000 in 1 years' time, Ksh3000 in 2 years' time and Ksh4000 in 3 years' time when the discount rate is 9% (7 marks)
- b) Find the gradient and the horizontal intercept of $l = \frac{3}{2}x + \frac{3}{4}y$ (4marks)
- c) Suppose that $f(n): \mathbb{N} \rightarrow \mathbb{N}$ is defined by $f(n) = 2n$. Define the domain and range of f . Is this function injective? (4marks)