



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2017/2018

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE
DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION
WITH INFORMATION TECHNOLOGY**

CITY CAMPUS - EVENING

ABA 107: MANAGEMENT MATHEMATICS I

Date: 18th January, 2018

Time: 5.30 - 7.30pm

INSTRUCTIONS:

- Answer Question ONE and any other THREE
- Question one carries 25 marks and the rest 15 marks each
- Show all your workings clearly



QUESTION ONE (25 MARKS)

- a) Discuss THREE applications of Set Theory in business. [6 marks]
- b) A revenue function is quadratic in nature. When $x = 5, R = 48$. Determine
- The revenue function. [2 marks]
 - The demand function. Hence the price when the quantity is $x = 5$ units. [3 marks]
- c) In a particular life insurance office employees Smith, Jones, William and Brown have "A" levels with Smith and Brown also having a degree. Smith, Melvin, William, Tyler, Moore and Knight are members of the ACII with Tyler and Moore having "A" levels. Let set A as those employees with "A" levels, set C as those who are ACII members and set D as graduates.

Required:

- Draw a Venn diagram representing sets A, D and C together with their elements. [4 marks]
 - What special relationship exists between sets A and D? [2 marks]
 - Specify the elements of the following sets and for each set, state in words what information is being conveyed by:
 - $A \cap C$ [2 marks]
 - $D \cup C$ [2 marks]
 - $D \cap C$ [2 marks]
- d) The cost C of processing an application for a certain job is given as $C = 0.001x^2 - 5 \ln x + 60$, where x = number of analysts. Calculate the cost when $x = 50$. [2 marks]

QUESTION TWO (15 MARKS)

- a) A salesman's daily wages is composed of a fixed amount and a variable component, which is dependent on the number of office cream units sold. He finds that when he sells 10 units on a given day, he earns Kshs. 600 whereas when he doubles his sales, his earnings increase by only Kshs 100.

Required:

- Fixed daily earnings [2 marks]
- Level of commission per unit sold [1 mark]

- iii. The salesman's earnings if he sells 30 units [2 marks]
 - iv. On a given day, the salesman is determined to earn Kshs 3500. Suppose on the previous day, he had guaranteed orders of 20 units, how many more must he sell in order to achieve his target earnings? [4 marks]
- b) In a recent survey of 400 students in a college, 100 were listed as studying Typing (T) and 150 were listed as doing Accounting (A). 75 were registered for both courses.
- Required:
- i. The number of students in the college who are not registered for either course. [4 marks]
 - ii. Those who were registered for typing only. [2 marks]

QUESTION THREE (15 MARKS)

- a) Differentiate between an annuity due and an annuity immediate. [4 marks]
- b) Suppose a student wishes to determine how much she will have at the end of 3 years if she deposits Ksh. 10000 at the end of each year in an account paying 4% interest rate. How much will she have after three years if the interest is computed:
 - i. Annually [2 marks]
 - ii. Semiannually [3 marks]
 - iii. Quarterly [3 marks]
 - iv. Monthly [3 marks]

QUESTION FOUR (15 MARKS)

- a) Ochieng' bought two shirts and 4 trousers at a total cost of Ksh 400 while Anyango bought 3 shirts and five trousers of the same type at a total cost of Ksh 600. Find the price of each shirt and each trouser. [6 marks]
- b) Jubilee Holdings has identified a project which will generate cash flow of Ksh 400,000 at the end of each year for the next three years. Given that the required rate of return on the capital is 12%, find how much capital the company needs to set aside for this project. [5 marks]
- c) Discuss two applications of functions in business management. [4 marks]

QUESTION FIVE (15 MARKS)

- a) A father has decided to set up an education fund for his newborn son. He deposits Ksh 5000 at the end of every year into an account which earns an interest rate of 10% compounded annually. What will be the accumulated amount in the account after 10 years? [6 marks]
- b) You are given the following.
 $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 $A = \{2, 4, 6, 8, 10\}$
 $B = \{1, 3, 7, 8, 6\}$
 $C = \{3, 7\}$
- i. Illustrate the sets in a Venn diagram. [4 marks]
- ii. Using your Venn diagram, list the elements in each of the following sets.
- I. $A \cap B$
- II. $B \cup C'$
- III. $A - B$ [3 marks]
- c) Define the following, giving an example in each case:
- i. Domain of a function [1 mark]
- ii. Range of a function. [1 mark]