



TECHNICAL UNIVERSITY OF MOMBASA
Faculty of Business and Social Studies

DEPARTMENT OF BUSINESS STUDIES

UNIVERSITY EXAMINATIONS FOR DEGREE IN
BACHELOR OF BUSINESS ADMINISTRATION
BACHELOR OF COMMERCE

BMS 4101: MANAGEMENT MATHEMATICS I

END OF SEMESTER EXAMINATIONS

SERIES: APRIL 2015

TIME: 2 HOURS

INSTRUCTIONS:

- Answer Question **ONE (Compulsory)** and any other **TWO** questions.
- Do not write on the question paper

This paper consists of Four printed pages

QUESTION 1 (Compulsory)

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

Required:

- i) Fixed daily earnings
- ii) Commission per unit sold
- iii) What are the salesman's earnings if he sells 30 units.
- iv) On a given day the salesman is determined to earn sh. 3,500. Suppose on the previous day he had guaranteed orders of 20 units, how many more units must he sell in order to achieve his target earnings. **(8 marks)**

- b) An arithmetic sequence has 60 terms. The first term and the common difference are 10 and 5 respectively.

Required:

- i) Find the 8th term
 - ii) Find the last term
 - iii) What is the sum of the terms of the sequence.
 - iv) Determine the sum of the last 15 terms of the sequence **(8 marks)**
- c) Mrs Ruth Otieno has the opportunity to deposit shs. 100,000 into a savings account which pays interest at an annual rate of 24%. Assuming that no additional deposits or withdrawals are made, what will be the ending balance of her account in five years if the interest is compounded:
- i) Annually
 - ii) Semi annually
 - iii) Quarterly
 - iv) Monthly **(8 marks)**
- d) A team of 5 qualified workers and 2 apprentices were paid sh. 244 for a job. Each apprentice was paid sh. 11 less than a qualified worker. How much was each apprentice paid? **(6 marks)**

QUESTION 2

- a) A sum of Ksh. 20,000 is invested, a part at 8% and the rest at 10% per annum. Find the amount invested at each rate if the total annual income from the two investments is Ksh. 1,900. **(6 marks)**
- b) Abraham Bakari took a mortgage of Ksh. 3,000,000 to purchase a residual house. The loan capital excluding interest is to be repaid in equal monthly instalments over a period of 2 years. An interest of 2% is charged on the monthly outstanding balance of the loan capital per month. The monthly instalment of the loan capital and the interest charged are paid at the end of each month.

Required:

- i) Determine the monthly instalment of the loan capita. **(2 marks)**
- ii) Prepare a loan repayment schedule for the first four months. Show the opening balance, the monthly interest charged, the monthly instalment of loan capital, the total monthly payment and the closing balance. **(8 marks)**
- iii) Determine the total interest paid on the loan over the 2 years period. **(4 marks)**

QUESTION 3

- a) Briefly but clearly, explain the difference between an independent variable and a dependent variable. Cite a suitable example. **(5 marks)**
- b) Rehema Company Ltd wishes to establish its cost, revenue and profit functions. Two points for units sold, Total cost and Total revenue have been recorded from the past and produced below:

Units (q)	50	100
Total cost	11,000	12,000
Total Revenue	1,500	3,000

Required

- i) Total cost function
- ii) Total revenue function
- iii) Total profit function
- iv) What is the expected profit when 6,000 units are produced and sold.
- v) Find the breakeven point in units. **(15 marks)**

QUESTION 4

- a) Distinguish between the following terms as used in set theory. Use a relevant example in each case.
- i) A set and a subset
 - ii) A finite and an infinite set **(6 marks)**
- b) A publishing Company has three main magazine publications A, B, and C. A market survey on the reading habits of 200 people surveyed revealed the following
- 84 people read magazine A
 - 111 people read magazine B
 - 73 people read magazine C
 - 59 people read magazine A and B
 - 32 people read magazine A and C
 - 53 people read magazine B and C.
 - 20 people read all three magazines

Required:

- i) Draw a Venn diagram to illustrate the above information
- ii) How many of those people surveyed:
 - a. Read just one of the magazines
 - b. Read just two of the magazines
 - c. Read none of the magazines

QUESTION 5

- a) You have decided to begin saving toward the purchase of a new house in five years. If you put sh. 20,000 at the end of each of the next 5 years in a savings account paying 10% compound interest per annum, how much will you accumulate after 5 years. How much interest will be earned on the deposits. **(8 marks)**
- b) How much money must be deposited at the end of each year if the objective is to accumulate sh. 1,000,000 by the time of the 20th deposit? Assume interest is earned at the rate of 15% per year compounded annually. How much interest will be earned on the deposits? **(8 marks)**
- c) Differentiate between annuity due and ordinary annuity. **(4 marks)**