



The Co-operative University College of Kenya
(A Constituent College of Jomo Kenyatta University of Agriculture & Technology)

SUPPLEMENTARY/SPECIAL EXAMINATION -2016

**EXAMINATION FOR THE DEGREE OF BACHELOR OF CO-OPERATIVE
BUSINESS**

UNIT CODE: HCOB 2105

UNIT TITLE: MANAGEMENT MATHEMATICS I

DATE:

TIME: 2 HOURS

INSTRUCTIONS:

- Answer question **ONE (compulsory)** and any other **TWO** questions

QUESTION ONE

- (a) Define the following terms as applied to set theory
- Set
 - Subset
 - Universal set
 - Element
 - Venn diagram (5 marks)
- (b) Out of 500 car-owners investigated in Nairobi west, 400 owned Datsun cars and 200 owned Fiat cars. 50 owned both Datsun and Fiat cars – is this data correct (4 marks)
- (c) Members of a group decided to raise KE100 towards a charity. Five of them were unable to contribute. The rest had therefore to pay KE 1 more each to realize the same amount. How many members were in the group originally (6 marks)
- (d) The population of bacteria in a culture is growing exponentially. At 12.00 there were 80 bacteria present and by 4.00pm there are 500 bacteria. Find an exponential function $F(t) = Ke^{at}$ that models this growth, and use it to predict the size of the population at 8.00 pm (5 marks)
- (e) Given $f(x,y) = X^4 - X^3y + 5y^2$ determine $f(-6,-7)$ (4 marks)
- ii) Solve for X in $\text{Log}(3x+4) - \text{log}(3-x) = 1$ (6 marks)

QUESTION TWO

- (a) The first term of a geometric sequence is $(x+1)$. If the third term of the same sequence is $(x+1)(x^2 - 2x+1)$ show that the second term is (x^2-1) (5 marks)
- (b) In a Geometric progression the sum of the 2nd and 3rd is 4 and the sum of the 3rd and 4th term is 2. Find the first and the common ratio (5 marks)
- (c) John's salary is Ke 12,000 p.a. His salary increases by 10% annually. Find the total amount he will have earned in six years (5 marks)
- (d) What is the least number of terms of Geometric progression $2+4+8+\dots$ that will give sum greater than 1,500,000

QUESTION THREE

- (a) Solve the simultaneous equation

$$\text{Log}_x y = 2$$

$$X_y = 8$$

(8 marks)

(b) Find the value of X in the equation

i. $4^x = 3$

(3 marks)

ii. $2^x + 1 = 3^x$

(3 marks)

(c) What was the population of a town. A four years ago if the present population is

800,000 and the growth rate is 5% p.a

(3 marks)

(d) A trader borrowed shs 12,460 from G financial Institution. The simple interest rate

was 12½% p.a. After 6 months, he paid back shs 8,460. How much did he still owe

the bank including interest

(5 marks)

QUESTION FOUR

(a) Sets P and Q and the corresponding universal set T are given by:

$$P = \{1, 5, 7, 8\} \quad T = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

Show that

i. $(P \cap Q)^c = P^c \cap Q^c$

(3 marks)

ii. $P^c \cup Q^c = (P \cap Q)^c$

(3 marks)

iii. Using venn diagrams represent par (i) and (ii) above

(4 marks)

(b) The quantity of coffee demanded is related to the price of coffee as shown by the

following function

$$Q = 3 - \frac{1}{3}P$$

Where Q is the quantity and coffee demanded and P is the price of Coffee. By

graphing this function, answer the following questions

i. Demand coffee when the price of coffee is Zero

(5 marks)

ii. Demand for coffee at the following price levels 2, 4 and 6

(5 marks)

QUESTION FIVE

(a) Solve $-4x + 2 \geq 2x - 10$

(4 marks)

(b) Solve the following

i. $\frac{1}{y} - \frac{3}{x} = 4$

ii. $\frac{3}{y} - \frac{4}{x} = 14$

(6 marks)

iii. $y^2 = x - 1$

$$y^4 + 3x = 7 \text{ for real numbers of } x \text{ and } y$$

(6 marks)

(c) Solve the equation

$$X^3 - 2x^2 - 3x = 0$$

(4 marks)