# The Co-operative University of Kenya

**END OF SEMESTER EXAMINATION – DECEMBER 2016**

**EXAMINATION FOR THE BACHELOR OF CO-OPERATIVE BUSINESS/ BACHELOR OF COMMERCE/ BACHELOR OF SCIENF IN FINANCE (BCOB YR I SEM I)**

**UNIT CODE: HCOB 2105/ HBC 2103/ CMFI 2101**

**UNIT TITLE: MANAGEMENT MATHEMATICS I/ MATHEMATICS FOR BUSINESS**

**DATE: 6TH DECEMBER, 2016** **TIME: 9:00 AM – 11:00 AM**

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**INSTRUCTIONS:**

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

**QUESTION ONE**

(a) Solve the equation:

$$\frac{x-3}{x} = \frac{2x}{x-1}$$ (4 Marks)

(b) Use graphical method to solve the following

$$2x + 6y = 23$$
$$4x + 7y = 10$$ (6 Marks)

(c) A company's total profit (£ 000) over a particular period is given by the function $17x^2 - 12x - 5x^3$where $x$ the number of items produced (in hundreds). If it is known that the maximum production possible for the period is 300items. Plot the company's profit per unit curve (3 Marks)

(d) The length of a rectangle is three times its breadth. If the breadth is decreased by 2M and the length increased by 4M, the area of the rectangle is decreased by a third. Find the breadth of the original rectangle. Hence find its area (7 Marks)

(e) Given that $\log 2 = 0.3010$ and $\log 3 = 0.4771$ Find

i. $\log 12$ (2 Marks)
ii. $\log 5$ (2 Marks)
iii. $\log 108$ (2 Marks)

(f) Solve the following

$$\log 12 + 3\log x = \log 96$$ (4 Marks)

**QUESTION TWO**

(a) The second term of an arithmetic sequence is 7 and the ninth term 28. Find the common difference and the first term of the sequence (4 Marks)

(b) In January, 2010, a man's salary was K£ 2,520 p.a. if his annual increment is K£ 108. Find what his salary was in January 2006 (6 Marks)

(c) 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)

**QUESTION THREE**

(a) A farmer invested Shs 48,000 for 5 years. Calculate the rate per annum of compound interest if the accumulated amount was Shs 77,304.50 (4 Marks)

(b) Solve the simultaneous equations: -
$y^2 = x - 1$ and $y^4 + 3x = 7$ for real value of x and y (6 Marks)

(c) The amount of money A invested over a period of n years at r% compound interest is given by the formula $A = P(1 + r)^n$
Required:
Obtain a linear expression in $A, p, n \; and \; r$ (5 Marks)

**QUESTION FOUR**

(a) A transport company which deals with parcels charges a fixed amount of money on the first 1 Kg every 1 Kg extra or part thereof, the rate per kilogram is different. John posts a parcel weighing 6Kg at a cost of Shs 350 while his sister Mary pays Kshs 230 to post a parcel of mass 4 grams

Find:

i. The charge on the first 1 Kg of parcel weight (4 Marks)
ii. The charge on each subsequent kilogram for any parcel (3 Marks)

(b) Explain the following

i. Universal set (2 Marks)
ii. Disjoint set (2 Marks)
iii. Equivalent sets (1 Mark)

(c) Find $a$ if $a^4 - 15a^2 - 34 = 0$ (3 Marks)

**QUESTION FIVE**

(a) Given that the Universal set contains real numbers from 1 to 100, find and prove that

i. $(A \cup B) \cup C = A \cup (B \cup C)$ (3 Marks)
ii. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (3 Marks)
iii. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (3 Marks)
iv. $(A \cap B) \cap C = A(B \cap C)$ (3 Marks)

(b) Let $\cup$ be $(1, 2, 3, 4, 5, 6), x(1,5)$ and $y(1, 2, 4)$ and $z(2, 5)$. Compute the following

i. $X \cap Y'$ (1 Mark)
ii. $(z \cap z) \cup y'$ (2 Marks)