THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

CERTIFICATE IN CONSTRUCTION TECHNICIAN (PART I)

AMA 1108: ALGEBRA I

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2012
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (20 Marks)

a) Simplify leaving the answer in index form

$$\frac{2^{-4}\times 5\times 4^{3}}{5^{4}\times 4^{2}\div 2^{-6}}$$

(6 marks)

b) Solve the equation using logarithms: $x^{-0.2} = 0.045$ **(7 marks)**

c) Solve the equation: $\log_5(2x-) = 2\log(x+1) - \log_5(x+3)$ **(7 marks)**

Question Two (20 marks)

a) Find the value of x in the equation $6 + 3x = 0.4x^2$ **(5 marks)**

b) The loading (w) of a spring is related to extension (L) by an expression of the form.

L = $aW + b$ where a and b are constants.

Experimental results for the loading are:

Load (w) in Newtons	20.0	30.0	40.0	60.0	80.0
Length (L) in cm	24.1	26.0	27.9	32.1	35.9

i) Use graphical method to determine the law.
ii) Find the value of the loading that would result into an extension of 15cm. **(15 marks)**

Question Three (20 marks)

a) Simplify $\dfrac{6^{-7}\times 7^{4}\times 3^{-2}}{\left(\frac{2}{3}\right)^{-7}\times\left(\frac{5}{3}\right)^{-4}}$ **(7 marks)**

b) Solve the equation: $25^{x} - 5^{x+2} + 10 = 0$ **(5 marks)**

c) Solve the following simultaneously:

$$2t_1 + 3t_2 + 2t_3 = 7$$
$$t_1 + t_2 + t_3 = 6$$
$$3t_1 - 3t_2 - 2t_3 = 3$$

(7 marks)

Question Four (20 marks)

$$\log_8 x = \frac{m}{2}, \log_{\frac{2}{2}} x = N \text{ and } N - m = 4$$

a) Given find the value of x. **(6 marks)**

b) (i) Draw the graph of $y = 2x^2 - 3x - 5 = 0$ for $-3 \le x \le 3$.

(ii) Use the graph obtained in b(i) to solve $2x^2 - 6x + 4 = 0$ **(14 marks)**

Question Five (20 marks)

a) Solve the following simultaneous equations:

$$p - q + r = -1$$
$$3p - 2q + r = 1$$
$$4p + q - 3r = 10$$

. **(7 marks)**

b) Solve the equation $2 + \frac{1}{x+1} = \frac{2}{x-1}$ **(6 marks)**

c) Solve the following simultaneously.

$$4^{x+2y} = 5$$
$$2^{x+3y} = 8$$

(7 marks)