



# **THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE**

(A CONSTITUENT COLLEGE OF JKUAT)

## ***Faculty of Applied & Health Sciences***

DEPARTMENT OF MATHEMATICS & PHYSICS

CERTIFICATE IN MEDICAL LAB SCIENCE

### **AMA 1105: FOUNDATION MATHEMATICS**

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES:** OCTOBER 2011

**TIME:** 2 HOURS

#### **INSTRUCTIONS:**

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

This paper consists of **FOUR PRINTED** pages

### QUESTION ONE (Compulsory)

(a) Solve  $2^{x+3} = 8^{x-1}$

(b) Use Pascal's triangle to write down the expansion of  $(x + y)^7$

(c) Rationalize  $\frac{8 + \sqrt{3}}{2 - \sqrt{3}}$

(d) Evaluate (i)  $A + B$

(ii)  $A - 7B - C$

Given  $A = \begin{pmatrix} 3 & 7 \\ 4 & 5 \end{pmatrix}$ ,  $B = \begin{pmatrix} -7 & 3 \\ 2 & 8 \end{pmatrix}$ ,  $C = \begin{pmatrix} -2 & 5 \\ 6 & 4 \end{pmatrix}$

(e) The sum of a number of terms of an arithmetic Progression is  $-19\frac{1}{2}$ , the first term is  $16\frac{1}{2}$  and the common difference is  $-3$ . Find the number of terms.

(f) Find  $\frac{dy}{dx}$  of  $y = 3x - 4x^3 + 4x^8$

### QUESTION TWO

(a) Solve by substitution

$$\begin{aligned} x + 3y &= 5 \\ 2x - 2y &= 7 \end{aligned}$$

(b) (i) Solve  $4^x - 12x - 2^x + 32 = 0$

(ii) Solve  $2^x = 15$

(c) Use the sine rule to calculate the length PR given triangle PQR has length  $r = 5.75$  cm and  $\angle P^\circ$  and  $\angle Q^\circ$  are  $42^\circ$  and  $65^\circ$  respectively.

$$\frac{\log 125}{\log 625}$$

(d) Simplify

$$\frac{9}{12} + \frac{12}{x+1}$$

(e) Solve  $= 6$

### QUESTION THREE

$$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

(a) Show that

$$\frac{dy}{dx} \quad y = (4x - 3)^3$$

(b) Find of

(c) Show that the sum of the first  $n$  terms of a Geometric Progression is given by

$$S_n = \frac{a(1 - r^n)}{(1 - r)}$$

$$(x^2 + x + 1) (x + 7)$$

(e) Simplify

(f) Solve by matrix method

$$x + 3y = 7$$

$$x - y = 5$$

### QUESTION FOUR

$$\frac{3}{x+2} - \frac{1}{x-2} - \frac{4}{x-4}$$

(a) Solve  $=$

$${}_4P_4 = 30{}_2P_2^r$$

(b) Solve

$$\frac{10!}{31,31,41,}$$

(c) Evaluate

(d) If a, 15, 9a form a geometric Progression. Find a, and the first three terms.

$$x = \log_3 7$$

(e) Evaluate to 3 s.f.

(f) Write down the fourth term in  $(a-7)^5$

### QUESTION FIVE

(a) Solve by quadratic formula  $y=3x^2 +8x + =0$

$$\frac{dy}{dx}$$

(b) From first principles find given that  $y = x^2$

$$\frac{5}{\sqrt[2]{3+\sqrt{2}}}$$

(c) Rationalize

(d) In an arithmetic Progression  $3 + 11 + \dots$  write down the 10<sup>th</sup> and 19<sup>th</sup> terms.

$$15\zeta_y$$

(e) Evaluate

(f) Solve for b given

$$\frac{\sqrt[2]{b}}{1-\sqrt{b}} = 4$$