THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Applied & Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

CERTIFICATE IN MEDICAL LABORATORY SCIENCE

AMA 1105: FOUNDATION MATHS

END OF SEMESTER EXAMINATION
SERIES: AUGUST/SEPTEMBER 2011
TIME: 2HOURS

Instructions to Candidates:
You should have the following for this examination
- Answer booklet

This paper consists of **FIVE** questions
Answer Question **ONE** (Compulsory) and attempt any other **TWO** questions
This paper consists of **THREE** printed pages

Question One

a) Evaluate $\sqrt[3]{(27^4)}$ (3 marks)

b) Expand $(4x-y)^3$ (3 marks)

c) Solve for *b* given

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

(3 marks)

d) Show that $\cos^2 x + \sin^2 x = 1$ (4 marks)

e) Find the perimeter and area of a triangle whose sides are x cm, 45cm and $x+9$ cm given $X+9$ (4 marks)

f) Find the determinant of the matrix $\begin{pmatrix} a & -2b \\ 2a & -3b \end{pmatrix}$ (3 marks)

g) Rationlize $\frac{1}{3-2\sqrt{b}}$ (3 marks)

h) Solve by factorization

$$2x^2 + 7x - 15 = 0$$

(4 marks)

Question Two

a) From definition find $\frac{dy}{dx}$ of $y = x^3$ (4 marks)

b) Make *t* the subject of the formula

$$y = \frac{1}{1+\sqrt{t}}$$

(3 marks)

c) Solve $\frac{x-3}{5} - \frac{x+1}{8} = 2$ (4 marks)

d) Solve $2^{x-1} = 7$ (4 marks)

e) In a geometric progression *n-3*, *n*, *n+3* represent three consecutive numbers. Find *n* and the term after *n+3* (5 marks)

Question Three

a) Find the numerical value of $5x^3 + 4xy - 3y^2$ given $x = 3, y = 2$ (4 marks)

b) Evaluate the other five trigonometric ratios given $\sin\theta = \frac{9}{41}$, and that θ is acute (6 marks)

c) Solve by completing the square method and leave your answer in surd form given

$$5x^2 - 6x - 2 = 0$$

(5 marks)

d) Solve $\log_2(x^2 - 9) = 3\log_2 2 + 1$ (5 marks)

Question Four

a) Show that the sum of the first *n* terms of an arithmetic progression in $sn = \frac{1}{2}n\{2a + (n-1)d\}$

(4 marks)

b) Make *n* the subject given $I\frac{nE}{R+nr}$ (2 marks)

c) Find the distance between $A(-3,-7)$ and $(7,9)$ and the equation of the line through them

(4 marks)

d) Evaluate

(i) $30P_7$ (3 marks)

(ii) $13C_8$ (3 marks)

e) Express in surd form and rationalize

$$\frac{1}{1+\sin 45^{o}}$$

(4 marks)

Question Five

$$A=\begin{pmatrix}5 & -7\\ 3 & 2\end{pmatrix}$$

a) Find the inverse of (3 marks)

$$5x-7y=3$$
$$3x+2y=5$$

And hence solve (4 marks)

$$0^{0} \le x \le 450^{0}$$

b) Find the values of X°, given sin x = 0.8660 for (4 marks)

c) One square Petri dish field has a side that 13 cm longer than the side of a smaller square field. The total area of the two fields is 1224cm^2. Find the size of each field (5 marks)

$$\log \tfrac{x}{4} - \log_4 (x-2) = 0.5$$

d) Solve for *x* given (4 marks)