



**TECHNICAL UNIVERSITY OF MOMBASA  
FACULTY OF HEALTH AND APPLIED SCIENCES  
DEPARTMENT OF MATHEMATICS AND PHYSICS  
UNIVERSITY EXAMINATION FOR:  
*CERTIFICATE IN MEDICAL LABORATORY SERVICES*  
*AMA 1105: FOUNDATION MATHEMATICS***

**END OF SEMESTER EXAMINATION**

**SERIES: MAY SERIES**

**TIME: 2 HOURS**

**DATE: MAY 2016**

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of 5 questions. Attempt question one compulsory and any other two questions

**Do not write on the question paper.**

**Question ONE (30 MARKS)**

a. Define the following terms used in mathematics.

i. An equation (2 mks)

ii. Transposition (2 mks)

b. Transpose the formulae below to make r the subject of the formulae.

$$d = 2\{(h)(2r - h)\}^{\frac{1}{2}} \quad (3\text{mks})$$

c. Derive the quadratic formulae and hence solve the equation below.

$$6x^2 - 8x - 9 = 0$$

(8 mks)

d. Solve for the unknowns in the set of equations below.

$$\frac{c+1}{4} - \frac{d+2}{3} + 1 = 0$$

$$\frac{1-c}{5} + \frac{3-d}{4} + \frac{13}{20} = 0$$

(7mks)

e. Solve for x below.

$$\log_3 16 + 2\log_3 x = \log_3 64$$

(3 mks)

f. Solve the following equation using completing the square.

$$x^2 - 6x - 4 = 0$$

(5mks)

### Question TWO (20 MARKS)

a. determine the slopes of the following graphs at the value of x indicated

i.  $y = 3x^2 + 4$  at  $x = 1.2$

ii.  $y = x^4 + 5x^3 - 6x^2 + 7x - 3$  at  $x = -2$

iii.  $y = 2x^3 + 4x^2 - 2x + 7$  at  $x = 2$  (9mks)

b. differentiate the following functions with respect to x

i.  $y = 5x^2 \sin x$  (4 mks)

ii.  $y = \frac{\ln x}{x^3}$  (4 mks)

c. Find  $\int (8x^3 - 3x^2 + 4x - 5) dx$  (3 mks)

**Question THREE (20 MARKS)**

a) Simplify the expression

$$K=2.76 \times (8.45 + 3.14) + 3.45^2 - 4.89 \div 2.18 \quad (3\text{mks})$$

b) solve for the unknown

$$(i). \frac{1}{3a-2} + \frac{1}{5a+3} = 0 \quad (3\text{mks})$$

$$(ii). \frac{3\sqrt{t}}{1-\sqrt{t}} = -6 \quad (3\text{mks})$$

$$(iii). \frac{2y}{5} + \frac{3}{4} + 5 = \frac{1}{20} - \frac{3y}{2} \quad (3\text{mks})$$

c) Solve following quadratic equation

i. By completing square

$$2x^2 + 9x + 8 = 0 \quad (4 \text{ mks})$$

i. By factorization

$$3x^2 - 11x - 4 = 0 \quad (4\text{mks})$$

**Question FOUR (20 MARKS)**

a) Given that  $x^2 = 3$

Find x (4mks)

b) solve for x

$$i. 4^{2x-1} = 5^{x+2} \quad (4 \text{ mks})$$

$$ii. 2^{x+1} = 3^{x-1} \quad (4 \text{ mks})$$

iii.  $X^{1.5} = 14.91$

(3mks)

c)  $\frac{1}{\left(\frac{4}{7} \times 2\frac{1}{4}\right)} \div \left(\frac{1}{3} + \frac{1}{5}\right) + 2\frac{2}{24}$  (3mks)

d)  $\frac{(2^4)^2 \times 3^{-2} \times 4^4}{2^3 \times 16^{\frac{1}{2}}}$  (2mks)

**Question FIVE (20 MARKS)**

a) A water tank is the shape of a rectangular prism having length 2m, breadth 75cm and height 50 cm. determine the capacity of the tank in

i.  $m^3$

ii.  $cm^3$

iii. litres

(6mks)

b) Determine the area of the circles having

i. Radius of 4 cm

ii. Diameter of 30 mm

iii. Circumference of 200 m

(7 mks)

c) Calculate area of the shaded template

(4mks)

d) If paving slabs are produced in 250mm by 250mm square. Determine the number of slabs required to cover an area of  $2m^2$

(3mks)