



**TECHNICAL UNIVERSITY OF MOMBASA**  
**FACULTY OF HEALTH AND APPLIED SCIENCES**  
**DEPARTMENT OF MATHEMATICS AND PHYSICS**  
**UNIVERSITY EXAMINATION FOR:**  
**CERTIFICATE IN MEDICAL LABORATORY SERVICES**  
**AMA 110: 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). A frustum (1 mks)

(ii). Napierian logarithms (1 mks)

b) Transpose the formulae below to make f the subject.

$$\frac{k}{r} = \sqrt{\frac{f+p}{f-p}}$$

(4 mks)

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

$$3x^2 - 14x + 18 = 0$$

(8 mks)

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

$$\frac{x}{5} + \frac{2y}{3} = \frac{49}{15}$$

$$\frac{3x}{7} - \frac{y}{2} + \frac{5}{7} = 0$$

( 4mks)

e) Solve the equation below by completing square

$$2x^2 + 10x - 7 = 0$$

( 5mks)

f) Evaluate the following

$$\int \frac{2x^3 - 3x}{4x} dx$$

(4mks)

g) simplify giving the answer in standard form

$$\frac{(2.4 \times 10^3)(3 \times 10^{-2})}{(4.8 \times 10^4)}$$

(3mks)

### Question TWO (20 MARKS)

a) determine algebraically from first principal, the slope of the following graphs at the value of x indicated

i.  $y = 4x^2 - 7$  at  $x = -0.5$

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

iii.  $y = 3x^3 - 2x^2 + x - 4$  at  $x = -1$

(9mks)

b) Find the volume in litres of the prism below

(6mks)

c) Find the equation of a line that passes through the points A ( 4 , 1) and B ( 0, 7) (3mks)

d) Find the gradient of a line which passes through the points ( 4, 3) and cuts the y axis through the point y = -3 (2 mks)

**Question THREE (20 MARKS)**

- determine the volume and total surface area of a cone of radius 5cm and perpendicular height 8cm (5mks)
- A cylinder is cast from a rectangular piece of alloy 5cm by 7cm by 12 cm. if the length of the cylinder is to be 60cm, find its diameter. (5cm)
- A boiler consists of a cylindrical section of length 8m and diameter 6 m, on one end of which is surmounted a hemispherical section of diameter 6 m, and on the other end a conical section of height 4m and base diameter 6 m. Calculate the volume of the boiler and the total surface area . (10mks)

**Question FOUR (20 MARKS)**

a. Solve the equation given below

$$5.4^{x+3} \times 8.2^{2x-1} = 4.8^{3x} \quad (6mks)$$

b.  $7(14.3^{x+5}) \times 6.4^{2x} = 294$  (6mks)

$$\frac{(3^2)^3 \times \left(8^{\frac{1}{3}}\right)^2}{(3)^2 \times (4^3)^{\frac{1}{2}} \times (9)^{-\frac{1}{2}}}$$

c. (3mks)

d. solve the equation

$$\log(x-1) + \log(x+1) = 2 \log(x+2)$$

(5mks)

**Question FIVE (20 MARKS)**

a. Rewrite the following without logarithms

$$\log W = 2(\log A + \log W) - (\log 32 + 2 \log A + 2 \log r + \log c)$$

(5mks)

b. Determine the value of

$$\frac{7}{6} \text{ of } \left(3 \frac{1}{2} - 2 \frac{1}{4}\right) + 5 \frac{1}{8} \div \frac{3}{16} - \frac{1}{2}$$

(4 mks)

c. solve following equation

i.  $\frac{x}{4} - \frac{x+6}{5} = \frac{x+3}{2}$  (3mks)

ii.  $\frac{1}{3}(3m-6) - \frac{1}{4}(5m+4) + \frac{1}{5}(2m-9) = -3$  (3mks)

d. solve simultaneous equation

$$1.5x - 2.2y = -18$$

$$2.4x + 0.6y = 33$$

(5mks)