



**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)

- a. determine the volume and total surface area of a cone of radius 5cm and perpendicular height 8cm (5mks)
- b. 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)
- c. 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)