



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS AND PHYSICS

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN MEDICAL LABORATORY SERVICES

AMA 1105: FOUNDATION MATHEMATICS

SPECIAL SUPPLEMENTARY EXAMINATION

SERIES: SEPT. 2017

TIME: 2 HOURS

Instructions to Candidates

- You should have the following for this examination
-Answer Booklet, examination pass and student ID
- This paper consists of **FIVE** questions.
- Attempt question **ONE (Compulsory)** and any other **TWO** questions
- Do **NOT** write on the question paper.
- **This paper consists of FOUR printed pages**

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.

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

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

$$6x^2 - 8x - 9 = 0 \quad (8 \text{ mks})$$

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

$$\frac{c+1}{4} - \frac{d+2}{3} + 1 = 0$$
$$\frac{1-c}{5} + \frac{3-d}{4} + \frac{13}{20} = 0 \quad (7 \text{ mks})$$

e. Solve for x below.

$$\log_3 16 + 2\log_3 x = \log_3 64 \quad (3 \text{ mks})$$

f. Solve the following equation using completing the square.

$$X^2 - 6x - 4 = 0 \quad (5 \text{ mks})$$

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 $x = 2$ (9 mks)

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

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

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

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

c) Solve following quadratic equation

i). By completing square

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

ii). By factorization

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

Question FOUR (20 MARKS)

a) Given that $x^2 = 3$

Find x (4 mks)

b) solve for x

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

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

$$iii. \quad X^{1.5} = 14.91 \quad (3 \text{ mks})$$

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

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

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
- (6 mks)**
- 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. **(4 mks)**
- d) If paving slabs are produced in 250mm by 250mm square. Determine the number of slabs required to cover an area of 2m^2 . **(3 mks)**