



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2014/2015

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR CERTIFICATE IN  
ELECTRICAL INSTALLATION

**SMA 0011: MATHEMATICS II**

**DATE: JULY 2015**

**TIME: 1½ HOURS**

**INSTRUCTIONS:** Answer question *one* and any other *three* questions

### QUESTION ONE (30 MARKS)

a) Given  $A = \begin{pmatrix} 5 & 2 \\ 3 & 0 \end{pmatrix}$   $B = \begin{pmatrix} 2 & 1 \\ 5 & 6 \end{pmatrix}$ , Find:

(i)  $AB$  (2 Marks)

(ii)  $A+2B$  (2 Marks)

(iii)  $A^{-1}$  (2 Marks)

b) Solve by any suitable method the linear simultaneous equations  $3x + 2y = 5$  and  $x - y = 2$   
(3 Marks)

c) Draw the graph of  $y = x^2 + 2x$ ,  $-3 \leq x \leq 3$  (5 Marks)

d) A floor of a room measures 20m by 16m. A carpet is placed round the room such that it leaves a margin of 100cm round the room. If  $1\text{m}^2$  of carpet cost Kshs.350, find the cost of carpeting the room (4 Marks)

e) Find  $x^2y^3 - 2xy$ , given  $x = 2$ ,  $y = -3$  (3 Marks)

f) Solve  $3x^2 - 4x - 4 = 0$  (3 Marks)

g) Convert  $0.\dot{3}1\dot{5}$  into a function (3 Marks)

h) Solve  $\left(\frac{x-2}{3}\right) + \left(\frac{x+1}{4}\right) = 2$  (3 Marks)

**QUESTION TWO (10 MARKS)**

a) Solve by matrix method, the linear simultaneous equations;  $x - y = 2$  and  $x + y = 3$  (5 Marks)

b) Find the volume and surface area of the solid below (5 Marks)

**QUESTION THREE (10 MARKS)**

a) Draw the graph of  $y = 2 + 2x - x^2, -3 \leq x \leq 2$ , hence use your graph to solve the equation

$$2 + 2x - x^2 = 0 \quad (7 \text{ Marks})$$

b) Find the value of x for which the following matrix is singular  $\begin{pmatrix} x+2 & x \\ 5 & 2 \end{pmatrix}$  (3 Marks)

**QUESTION FOUR (10 MARKS)**

a) Find the surface area of the frustum below (5 Marks)

b) Define the following terms as applied in mathematics:

- (i) Perimeter (1 Mark)
- (ii) Area (1 Mark)
- (iii) Surface area (1 Mark)
- (iv) Volume (1 Mark)
- (v) A matrix (1 Mark)

**QUESTION FIVE (10 MARKS)**

- a) Solve graphically;  $3x - 2y = 6$  and  $x + y = 4$  (5 Marks)
- b) Form a quadratic equation whose roots are -2 and 4 (2 Marks)
- c) Factorise completely;  $\frac{x^2 - 9}{x^2 + 6x + 9}$  (3 Marks)