

MURANG'A UNIVERSITY COLLEGE

(A constituent college of Jomo Kenyatta University of Agriculture and Technology)

SCHOOL OF ENGINEERING

ELECTRICAL AND ELECTRONICS ENGINEERING

SUPPLEMENTARY EXAMINATION

AUGUST 2015

EE/P/14CM SEE 0103

MATHEMATICS

TIME 2HRS

INSTRUCTION; Answer question one and any other two questions

Q1. (a) If $A = \begin{pmatrix} 1 & 0 \\ 7 & -4 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -1 \\ -7 & 4 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 0 \\ -2 & -4 \end{pmatrix}$ find $2A + 3B - 2C$ (5mks)

(b) If $P = \begin{pmatrix} 3 & 4 & 0 \\ -2 & 6 & -3 \\ 7 & -4 & 1 \end{pmatrix}$ and $Q = \begin{pmatrix} 2 & -5 \\ 5 & -6 \\ -1 & -7 \end{pmatrix}$ find $P \times Q$ (5mks)

(c) Determine the inverse of the following matrix

$$A = \begin{pmatrix} 3 & -1 \\ -4 & 7 \end{pmatrix} \quad (5\text{mks})$$

(d) Differentiate $y = 3x^3$ from the first principles. (5mks)

(e) Differentiate with respect to x

$$Y = 5x^4 + 4x^2 \quad (5\text{mks})$$

(f) A farmer wants to make a sheepfold which is rectangular in shape .

He erects the three sides as the fourth side is provided by a hedge already in existence.

Find largest area of enclosure that can be made if the total length to be fenced is 80m.

(5mks)

Q2. (a) Use matrices to solve the simultaneous equations ;

$$3x + 5y = 7$$

$$4x - 3y = 19$$

(10mks)

(b) Evaluate $\frac{dy}{dx}$ given that $y = \frac{\sin x}{\cos x}$ (6mks)

(c) Find the equation of the tangent to the curve described by the equation

$$y = x^4 - 3x^2 + 2x \text{ at the point where } x = 2 \quad (4\text{mks})$$

Q3. Use matrices to solve the following simultaneous equations ;

$$x + 2y + 3z = 5$$

$$2x - 3y - z = 3$$

$$-3x + 4y + 5z = 3 \quad (20\text{mks})$$

Q4 (a) $\int_1^5 (4x + 2)^2 dx \quad (4\text{mks})$

(b) i) $\frac{dy}{dx}$ given that $y = \frac{(x^2+8x)}{(x+1)}$ (6mks)

ii) $\int (2x^2 + x) dx \quad (4\text{mks})$

(c) Given that $y = e^{2x} \sin x$ find $\frac{dy}{dx}$ (6mks)