

EASTERN UNIVERSITY, SRI LANKA

FIRST YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE – 2011/2012

(Nov/Dec – 2013)

AE 1102 – Applied Mathematics for Agricultural Science (1:15/00)

Answer all questions

Time: One hour

1. (a) Find the equation of a straight line passing through the point (4, -1) and perpendicular to the line of  $2x - 3y = 9$ .

(b)

i. Let  $A = \begin{pmatrix} 1 & -2 & 0 \\ 8 & 7 & -5 \\ 6 & -2 & 3 \end{pmatrix}$   $B = \begin{pmatrix} 8 & 4 & -1 \\ 4 & -3 & -2 \\ 6 & 4 & 1 \end{pmatrix}$  and  $C = \begin{pmatrix} 2 & 0 & -5 \\ 1 & 4 & 2 \\ -1 & 0 & -1 \end{pmatrix}$ .

Find the matrix  $A + 2B - 3C$ .

- ii. Find the matrix  $AB$  if

$$A = \begin{pmatrix} 7 & 3 \\ 2 & 5 \\ 6 & 8 \\ 9 & 0 \end{pmatrix} \text{ and } B = \begin{pmatrix} 7 & 4 & 9 \\ 8 & 1 & 5 \end{pmatrix}$$

- (c) Evaluate the following limits:

i. limit  $\lim_{x \rightarrow 4} \frac{x^2 - \sqrt{x}}{4 - x}$  ;

ii. limit  $\lim_{x \rightarrow \alpha} \frac{3x + 5}{x - 9}$  ;

(PTO)

2. (a) Differentiate the following functions with respect to the variable  $x$ :

i.  $y = x^7 (7x^4 + 3)$  ;

ii.  $y = \frac{(x + 3)}{(x^2 + 6x + 2)}$  ;

iii.  $y = \frac{(x^2 + 2x)^4}{(x^3 + 3x^2 + 7)^3}$  ;

iv.  $y = \log \sqrt{5x^4 + 4x}$  .

(b) Integrate the following with respect to  $x$ :

i.  $(x + 3)^2$  ;

ii.  $\frac{x^3}{(x^4 + 8)}$  ;

iii.  $e^{8x}$  ;

iv.  $(3x + 2)(x - 2)$ .