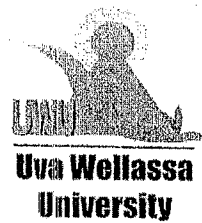
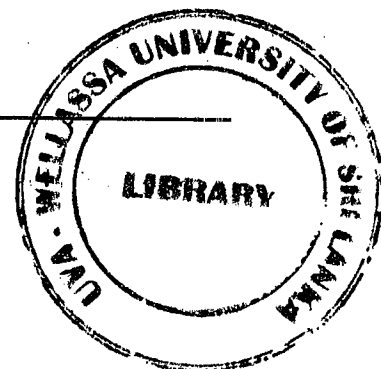


UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF ANIMAL SCIENCE & EXPORT AGRICULTURE



BSc in Export Agriculture
BSc in Palm & Latex Technology and Value Addition
BSc in Tea Technology and Value Addition
First Year First Semester Examination – June/ July 2017

Mathematics for Biological Science (EAG 101-1)
Essay Questions



Instructions:

Answer all questions in the given booklet.

No. of questions : Three (03)

No. of pages : Two (02)

Time : One (01) hour

Total marks allocated : 100%

Calculators are not allowed.

01.

(I) Volume of a right-triangle based prism is $(2x^3 - 12x^2 - 50x - 36)$. If the height of this prism is $(x + 2)$;

a) What is the area of the right-triangle?

(08 marks)

b) If base of right angle triangle is $(x + 1)$, what is the height of right angle triangle?

(07 marks)

(II) Draw the following graph on the same Cartesian plane.

(10 marks)

$$f(x) = \begin{cases} 1 - x & x < -2 \\ -x^2 & -2 \leq x < 2 \\ x - 1 & 2 \leq x \end{cases}$$

(III) Find the limits of the following functions.

a) $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x + 5}$

(05 marks)

$$b) \lim_{x \rightarrow \alpha} \frac{3x^3 - 2x + 1}{2x^3 - 4x^2}$$

(06 marks)

$$c) \lim_{x \rightarrow 1} \frac{3x^2 + 6x - 9}{x^2 - 1}$$

(06 marks)

$$d) \lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$$

(08 marks)

02.

(I) Prove that $\frac{d}{dx} (2x^2 + 3x + 1) = 4x + 3$ using the definition of derivatives.

(05 marks)

(II) Find the derivative of following functions with respect to x .

$$a) y = x^5 - x^{-2} + 3x - 1$$

(04 marks)

$$b) y = e^{2x+1} \cdot \cos 2x^2$$

(06 marks)

$$c) y = \cot x$$

(07 marks)

(III) A farmer plans to cultivate banana trees in his land. Cultivation cost (y) of the land depends on number of banana trees (t) as given in below.

$$y = 2t^2 - 16t + 53$$

Find the number of trees (t) which gives the minimum cultivation cost.

(08 marks)

03. Integrate the following functions with respect to x .

$$(I) \int 5x^4 - x^{-3} + 2 \, dx$$

(05 marks)

$$(II) \int (2x^3 + x)^6 \, dx$$

(08 marks)

$$(III) \int \tan x \, dx$$

(07 marks)

[End of the Paper]

