

Uva Wellassa University
Faculty of Animal Science & Export Agriculture
B.Sc. in Animal Science / B.Sc. in Aquatic Resource Technology / B.Sc. in Export Agriculture / B.Sc. in Tea Technology & Value Addition / B.Sc. in Palm & Latex Technology and Value Addition



End Semester Examination September/ October 2015
Year I Semester I

Mathematics for Biological Sciences (EAG 102-0 / AAS 104-0)

Instructions to Candidates

Answer **All** questions.

No. of questions : Four (04)

No. of pages : Two (02)

Total marks allocated : 100%

Time : Two (02) hours

Use standard symbols without definition.

Scientific calculators are allowed.

Question 1

- 1.1 Simplify the following expression. (7 marks)

$$\frac{9a^{\frac{4}{3}} \times a^{-\frac{1}{2}}}{2a^{\frac{3}{2}} \times 3a^{\frac{1}{3}}}$$

- 1.2 Find the value of x ; $7^{x-1} = 49$. (5 marks)

- 1.3 Solve the following equation for x . (5 marks)

$$\log_{10} 20 + \log_{10} 5 = \log_{10} x$$

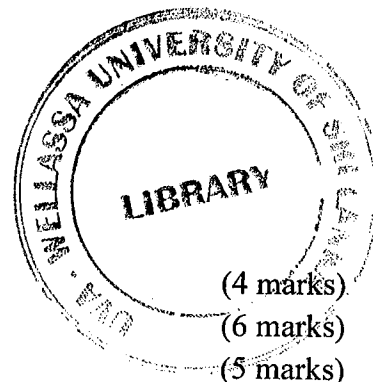
- 1.4 Draw the graph of the following function. (8 marks)

$$f(x) = \begin{cases} -x + 6; & \text{if } x < 3 \\ 3 & ; \text{if } x \geq 3 \end{cases}$$

Question 2

2.1 Let $A = \begin{pmatrix} 1 & -1 & 2 \\ 2 & 3 & 4 \\ 3 & 1 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 0 & 3 \\ 1 & 5 & 0 \\ 0 & 4 & -1 \end{pmatrix}$, find;

- a) $A + B$
- b) AB
- c) $\det(A)$; determinant of matrix A



(4 marks)

(6 marks)

(5 marks)

- 2.2 Solve the following system of linear equation using **Gauss-Jordan elimination method**.

$$x_1 + x_2 = 1$$

$$x_2 + x_3 = 3$$

$$x_1 + 2x_2 + x_3 = 4 \quad (10 \text{ marks})$$

Question 3

- 3.1 Find the each of the following limits.

a) $\lim_{x \rightarrow 2} x^2 + 3$ (5 marks)

b) $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4}$ (5 marks)

c) $\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3}$ (5 marks)

- 3.2 Differentiate the following functions with respect to x .

a) $y = x^3 + 2x^2 + 3$ (5 marks)

b) $y = e^x \ln x$ (5 marks)

Question 4

- 4.1 Integrate the followings with respect to x .

a) $\int (x^3 + 6x^2 - 2x + 15) dx$ (5 marks)

b) $\int x^3(x + 2) dx$ (5 marks)

- 4.2 Find the value of the definite integral $\int_1^2 (x^3 + 5) dx$. (5 marks)

- 4.3 Water flows from the bottom of a storage tank at a rate of $r(t) = 150t^2 - 5t$ liters per minute, where $0 \leq t \leq 30$. Find the amount of water that flows the tank during first 15 minute. (10 marks)