



**FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE**  
**DEPARTMENT OF ANIMAL SCIENCE**

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**BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL SCIENCE**

**ANIMAL BIOTECHNOLOGY (LAS 4208)**

**SEMESTER 2 EXAMINATION**

**MAY/JUNE 2023**

**Time Allowed:** 3 hours  
**Special Requirements:** None  
**Examiner's Name:** V. MDLONGWA

**Instructions to Candidates:**

1. The paper consists of seven questions, answer **ALL** questions in **Section A** and **any two** in **Section B**.
2. Marks for each question are shown in brackets. Where a question has subdivisions, the marks for each subdivision are given.
3. Illustrate your answer, where applicable, with large clearly labelled diagrams.

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
<b>SECTION A</b>	<b>60</b>
<b>SECTION B</b>	<b>40</b>
<b>TOTAL ATTAINABLE MARKS</b>	<b>100</b>

*This paper consists of three printed pages.*

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## SECTION A; ANSWER ALL QUESTIONS IN THIS SECTION

### Question 1

Describe the following databases with respect to biological content

- a) Genebank [4]
- b) EMBL [4]
- c) SWISSPROT [4]
- d) PDB [4]
- e) PubMed [4]

### Question 2

- a) Discuss the importance of metabolomics in animal health [10]
- b) Give an account of the advantages and disadvantages of genomic selection. [10]

### Question 3

- a) Describe 3 animal models that are used for research in animal biotechnology. [6]
- b) State the regulations related to the use of animal models in animal biotechnology. [4]
- c) Describe the process of sperm sexing using the swim up procedure. [3]
- d) State the advantages of intrauterine insemination. [3]
- e) Describe the process of embryo splitting. [4]

## SECTION B: ANSWER ANY TWO QUESTIONS

### Question 4

- a) Discuss the legal, ethical and biosafety issues with regards to the use of genetically modified goats. [20]

### Question 5

- a) What is the average frequency of restriction sites in a random DNA sequence. [2]
- b) State the characteristics of a gene delivery vector. [5]
- c) Explain the TWO types of gene therapy used in animal biotechnology. [8]
- d) Outline the cell based delivery method in gene therapy. [5]

**Question 6**

a) Explain briefly what first, second and third generation vaccines are.

[6]

b) What are DNA vaccines.

[4]

c) Fill in the table of Embryogenesis

DAY	Description
1	
	2 cell embryo
3-4	
5-6	
11-14	

[5]

d) Fill in the following table

Type	Description
Totipotent	
Pluripotent	
Multipotent	

[3]

e) State the advantages of using SNPs in animal breeding.

[2]

**END**

