



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF APPLIED SCIENCE**  
**DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY**  
**BACHELOR OF SCIENCE HONOURS DEGREE IN BIOTECHNOLOGY**  
**ANIMAL AND PLANT PHYSIOLOGY (SBT1102)**

**Main Examination Paper**  
**DECEMBER 2024**

This examination paper consists of 2 pages

Time Allowed : 3 hours  
Total Marks : 100  
Special Requirements : NONE  
Examiner's Name : DR K. MUSHONGA

**INSTRUCTIONS**

1. Answer **TWO (2)** questions from Section A and **TWO (2)** questions from Section B.
2. Each question carries 25 marks.
3. Where a question contains subdivisions, the mark value for each subdivision is given in brackets.
4. Illustrate your answer where appropriate with large, clearly labelled diagrams.

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	<b>25</b>
2.	<b>25</b>
3.	<b>25</b>
4.	<b>25</b>
5.	<b>25</b>
6.	<b>25</b>
<b>TOTAL</b>	<b>100</b>

### Section A (Animal Physiology)

1. (a) Describe and explain the development of active immunity in mammals following the injection of a cowpox vaccine. (15 marks)
- (b) Describe the general workflow of the 'hybridoma technology' for the production of therapeutic monoclonal antibodies. (10 marks)
2. Write short notes on the following:
  - (a) Electrical excitation of the heart. (7 marks)
  - (b) Synaptic transmission. (6 marks)
  - (c) Antidiuretic hormone in water reabsorption by the kidneys. (6 marks)
  - (d) Hormonal control of feeding behaviour in humans. (6 marks)
3. Describe gas exchange across respiratory surfaces including the structure, mechanisms, and control of ventilation in mammals.

### Section B (Plant Physiology)

4. With reference to *Arabidopsis* and maize, describe how the morphological similarities and differences between eudicot and monocot embryos dictate their patterns of development.
5. Write short notes on the following:
  - (a) Mass/bulk flow during solute transport. (7 marks)
  - (b) Light dependent reactions of photosynthesis. (6 marks)
  - (c) Secondary growth of stems. (6 marks)
  - (d) Polar transport of auxins. (6 marks)
6. Write an essay on mycorrhizal symbioses in facilitating plant mineral nutrition.

**END OF EXAMINATION**