



MACHAKOS UNIVERSITY

University Examinations 2019/2020 academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR
BACHELOR OF SCIENCE AGRICULTURAL EXTENSION AND EDUCATION

SBT 100: CELLULAR BASIS OF LIFE

DATE: 20/1/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS

1. Answer Question one (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

QUESTION ONE (30 MARKS)

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|----|---|-----------|
| a) | Explain the principles of the cell theory | (3 marks) |
| b) | Discuss the meaning of the Biological concept of life | (3 marks) |
| c) | Briefly, describe the structure and functions of lysosomes | (3 marks) |
| d) | List the main functions of the universal cell membrane | (3 marks) |
| e) | Describe the functions of plastids in plant cells | (3 marks) |
| f) | Using examples, discuss the role of Biophysics in the study of Biological systems | (3 marks) |
| g) | Explain the meaning of cell specialisation and multicellularity | (3 marks) |
| h) | Highlight the components of a nucleic acid molecule | (3 marks) |
| i) | Explain the biological significance of meiosis | (3 marks) |
| j) | Describe the structure and distribution of mitochondria | (3 marks) |

QUESTION TWO (20 MARKS)

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|----|---|------------|
| a) | Describe the process of the scientific method | (10 marks) |
| b) | Explain the structural differences between prokaryotic and eukaryotic cells | (10 marks) |

QUESTION THREE (20 MARKS)

- a) Describe the structure, distribution and functions of various cell organelles (10 marks)
- b) Discuss the mechanisms of movement of substances in and out of cells (10 marks)

QUESTION FOUR (20 MARKS)

- a) Explain the chemical and physical structure of nucleic acid molecules (10 marks)
- b) Discuss the processes of replication and transcription of DNA (10 marks)

QUESTION FIVE (20 MARKS)

- a) Highlight the similarities and differences between mitosis and meiosis (10 marks)
- b) Explain the occurrence, structure and function of mRNA, rRNA and tRNA (10 marks)