# 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)**

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)**

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 occurence, structure and function of mRNA, rRNA and tRNA (10 marks)