



MACHAKOS UNIVERSITY

University Examinations 2019/2020 academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SBT 300: CELL BIOLOGY AND GENETICS

DATE: 22/1/2021

TIME: 8.30-10.30 AM

INSTRUCTIONS

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

SECTION A

QUESTION ONE COMPULSORY (30 MARKS) –

- a) Briefly describe the structure and functions of the following cell organelles:-
 - i. Nucleus (1.5 marks)
 - ii. Centrioles (1.5 marks)
- b) Explain the role of cell cytoskeleton (3 marks)
- c) Using examples, describe cell motility (3 marks)
- d) Explain the relationship between the genotype and phenotype of an organism (3 marks)
- e) Explain whether a true breeding individual can make more than one kind of gametes. (3 marks)
- f) Explain the following mechanisms of speciation:-
 - i. Geographical isolation (1.5 marks)
 - ii. Reproductive isolation (1.5 marks)
- g) Explain the sex-determining genes in mammals. (3 marks)
- h) Differentiate between DNA and RNA (3 marks)
- i) Differentiate between prophase in meiosis and in mitosis (3 marks)
- j) Describe cell fractionation and explain its importance in cell biology (3 marks)

SECTION B

QUESTION TWO (20 MARKS)

- a) Describe the mechanisms of gene transfer in a bacterial cell (10 marks)
- b) With an example discuss sex linkage phenomenon in living organisms (10 marks)

QUESTION THREE (20 MARKS)

Discuss Transcription and translation processes in protein biosynthesis

QUESTION FOUR (20 MARKS)

Discuss mitotic cell division

QUESTION FIVE (20 MARKS)

- a) Explain the importance of evolution in speciation (5 marks)
- b) Describe the gene structure (15 marks)