



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (BIOLOGY)

SZL303: ESSENTIALS OF MOLECULAR BIOLOGY

DATE: 8/12/2021

TIME: 11:00 – 1:00 PM

INSTRUCTIONS

Answer Question 1 and any other two questions

Illustrate your answer with clean labelled diagrams wherever appropriate

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Outline the possible causes of mutagenesis (3 marks)
- b) Distinguish between pyrimidines and purines (3 marks)
- c) Explain how GMOs may be formed (3 marks)
- d) Explain the functions of the main parts of a bacteriophage (3 marks)
- e) Explain the role of nucleoplasm in cells (3 marks)
- f) Explain the lytic cycle of phage replication (3 marks)
- g) Explain any three practical applications of molecular techniques (3 marks)
- h) Explain the concept of reverse transcription (3 marks)
- i) Explain the effects of a gene mutation (3 marks)
- j) Outline the properties of transposons (3 marks)

QUESTION TWO (20 MARKS)

- a) Discuss the properties of the genetic code (9 marks)
- b) Outline the process of transcription (11 marks)

QUESTION THREE (20 MARKS)

- a) Account for codons used in an RNA molecule during the synthesis of a polypeptide chain. (10 marks)
- b) Describe the various bonds present in a DNA molecule. (10 marks)

QUESTION FOUR (20 MARKS)

- a) Differentiate between transcription and translation (10 marks)
- b) Discuss how macromolecules can be separated in a laboratory (10 marks)

QUESTION FIVE (20 MARKS)

Discuss the process of PCR.