



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SZL303 ESSENTIALS OF MOLECULAR BIOLOGY

DATE: 26/9/2019

TIME: 2.00-4.00 PM

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

- a) Describe the Okazaki fragment giving its significances (3 marks)
- b) Describes the process of ligation and insertion of genes in a plamid (3 marks)
- c) Briefly describe the basic structure of mRNA. Use diagram where possible (3 marks)
- d) Using a simple equation describe the formation of the aminoacyl-Trna (3 marks)
- e) Describe Watson and Crick Model of DNA (3marks)
- f) Identify the salient features of the polymerisation stage of transcription (3 Marks)
- g) Describe the Wobbling phenomenon in RNA translations giving a specific example (3marks)
- h) The genetic codes are degenerate. Briefly discuss (3 marks)
- i) Describe the biological significance of the DNA directed RNA synthesis (3marks)
- j) Briefly discuss three salient features of a Eucaryotic promoter regions (3 Marks)

SECTION B

QUESTION TWO

- a) Discuss DNA replication (10 Marks)
- b) In the context of RNA discuss the Nucleotides. Use structures where necessary (10 Marks)

QUESTION THREE

- a) Discuss plasmids and their importance in genetic cloning (10 Marks)
- b) Design an experiment to explain the phenomenon of semi-conservativeness of DNA replication (10 Marks)

QUESTION FOUR

Discuss the principles and procedures of any two Nucleic acid based hybridization experiments (20 Marks)

QUESTION FIVE

- a) Describes the stages involved in the elongation and termination stages of protein translation (10 marks)
- b) Discuss the post-translation modification of protein as a regulatory mechanism (10 Marks)