



**COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS**

END OF SEMESTER SUPPLEMENTARY EXAMINATIONS

NSLS105: GENETICS AND MOLECULAR BIOLOGY

AUGUST 2021

LECTURER: MR Z. CHIWODZA

DURATION: 7 HOURS

DATE: 20 AUGUST 2021 0900 hrs

INSTRUCTIONS

1. Write your candidate number on your answer sheets.
 2. Answer any **one** question of your choice.
 3. Each full question carries 100 marks
 4. Submit your answer script as a PDF through Moodle **ONLY**.
 5. Use the following specifications in your answer script:
Font: Times New Roman
Font size: 12
Line spacing: 2.0
 6. Credit will be given for logical, systematic and neat presentations.
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Answer any ONE question

Question 1

- a. Describe the experiment that lead to the adoption of the Semi-Conservative Theory of replication of DNA. **[20 marks]**
- b. Explain the process of initiation of translation in prokaryotes and how it differs in eukaryotes. **[30 marks]**
- c. Couple **Z** are fighting over the paternity of a child. Describe the molecular tests you can use to determine who the father of the child is. **[50 marks]**

Question 2

- a. What are the modifications that can be done on a DNA molecule before it can be translated into a protein? **[20 marks]**
- b. Describe the initiation of DNA replication in prokaryotes and how it differs from the same process in eukaryotes. **[30 marks]**
- c. The ability of a cell to switch a gene on or off (gene regulation) is an important survival mechanism in prokaryotes. Explain how an organism like *Escherichia coli* can regulate metabolism of tryptophan at molecular level. **[50 marks]**

Question 3

- a. Outline the chemical and functional differences between DNA and RNA. **[20 marks]**
- b. Explain how you would obtain a pure DNA sample from a sputum sample. **[30 marks]**
- c. Zimbabwe has recently been hit by the new SARS CoV-2 Delta variant (B.1.617.2). Give a detailed account of the molecular technique that is used to determine how this variant is different from the Beta variant (B.1.351). **[50 marks]**

THE END