AFRICA UNIVERSITY
A United Methodist-Related Institution
"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS

END OF SEMESTER FINAL EXAMINATIONS

NSLS105: GENETICS AND MOLECULAR BIOLOGY

LECTURER: Mr Z CHIWODZA

DURATION: 7 HOURS

DATE: 7 MAY 2021

INSTRUCTIONS

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

Question 1

a) Give a detailed account of cell division as it occurs in a eukaryotic somatic cell. (20 marks)

b) Explain, using an example of your choice how a defect in cell division can lead to disease. (30 marks)

c) A newly married couple wants to have a baby. Both the husband and wife however, are carriers of an autosomal recessive trait of the disease called TAY-SACHS. Give a description of the options available to them and the ethical concerns for each of them. (50 marks)

Question 2

a) Describe the modifications that can be done on a polypeptide chain to make it a fully functional protein? (20 marks)

b) Describe the features of the genetic code. (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 lactose fermenting bacteria like *Escherichia coli* are able to regulate the metabolism of lactose in their environment. (50 marks)

Question 3

a) Describe in detail, the principles of the central dogma of molecular biology. (20 marks)

b) Explain how Southern Blotting can be used to detect an inherited disease of your choice. (30 marks)

c) Patient **Z** is HIV positive and he is on antiretroviral therapy. Give a detailed account of the molecular technique that can be used to monitor if his antiretroviral drugs are working to suppress his viral load. (50 marks)

THE END