(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS (SUPPLEMENTARY/SPECIAL) 2021/2022 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE, HUMAN NUTRITION AND DIETETICS

COURSE CODE: HND 201

COURSE TITLE: CELL BIOLOGY AND IMMUNOLOGY

DATE: 05/08/2022 **TIME:** 8:00 - 10:00AM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C,** carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). **Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

SECTION A: Multiple Choice Questions (10 marks).

1. Which of the following is not a component of a DNA:
   a. Uracil
   b. Adenine
   c. Hydroxymethyl cytosine
   d. Ribose
2. Is a high energy intermediate molecule pyrimidine molecule:
   a. ATP
   b. UTP
   c. CMP
   d. UDPG
3. Arrange in order the enzymes as involved in replication of DNA in bacteria?
   I. DNA polymerase I
   II. 5' exonuclease
   III. DNA polymerase III
   IV. Ligase
   V. Primase
   a. V, III, I, II, IV
   b. III, II, I, V, IV
   c. V, III, IV, II, I
   d. V, III, II, I, IV
4. Which of the following activities is typical of histones during replication of eukaryotic DNA?
   a. They remain bound to the DNA throughout replication
   b. They undergo proteolysis and are replaced by newly synthesized protein on each daughter strand
   c. They are both conserved and associated with the leading daughter strand and newly synthesized and associated with the lagging daughter strand.
   d. They are not synthesized for cell division but are retained from generation to generation
5. Which of the following is a nonsense codons role:
   a. Amino acid activation
   b. Initiation of protein synthesis
   c. Termination of protein synthesis
   d. Elongation of polypeptide chains
6. During transcription process the genetic information flow from:
   a. DNA to DNA
   b. DNA to protein
   c. RNA to protein
   d. DNA to RNA
7. Reverse transcriptase is:
   a. DNA dependent DNA polymerase

b. DNA dependent RNA polymerase
c. RNA dependent DNA polymerase
d. RNA dependent RNA polymerase

8. During repression the following is transcribed:
   a. Structural gene
   b. Promoter gene
   c. Regulator gene
   d. Operator gene
9. Restriction endonucleases:
   a. Excise introns from hn-RNA
   b. Polymerise nucleotides to form RNA
   c. Remove primer from Okazaki fragments
   d. Protect bacteria from foreign DNA
10. Rho (ρ) factor:
    a. increases the rate of RNA synthesis
    b. Binds catabolite repressor to the promoter region
    c. Terminates transcription
    d. Allows proper initiation of transcription

SECTION B: Short Answer Questions. Answer all questions (30 marks).

11. Write short notes on three types of RNAs involved in protein synthesis (6 marks).
12. Briefly explain three models of DNA replication (6 marks).
13. Demonstrate the central dogma of molecular biology (6 marks).
14. Explain three major components of the nucleic acids (8 marks).
15. Discuss the role of four enzymes involved in the process of DNA replication (4 marks).

SECTION C: Long Answer Questions. Answer only two questions (30 marks).

16. Explain four bonds involved in the formation of DNA strand (15 marks).
17. Explain protein biosynthesis in eukaryotic organisms (15 marks).
18. Explain different types of DNA mutations, their causes and the repair mechanisms (15 marks).