(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(KAKUMA CAMPUS)

UNIVERSITY EXAMINATIONS (MAIN PAPER) 2021/2022 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTEREXAMINATIONS

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

COURSE CODE: HND 201

COURSE TITLE: CELL BIOLOGY AND IMMUNOLOGY

DATE: 28/04/2022 **TIME:** 3.00 -5.00 PM

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

This Paper Consists of 3 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (10 marks).

1. RNA does not contain:
   a. Uracil
   b. Adenine
   c. Hydroxymethyl cytosine
   d. Ribose
2. Which pyrimidine nucleotide acts as the high energy intermediate?
   a. ATP
   b. UTP
   c. CMP
   d. UDPG
3. Which of the sequences listed below best describes the order in which the following enzymes participate in the 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. Nonsense codons bring about:
   a. Amino acid activation
   b. Initiation of protein synthesis
   c. Termination of protein synthesis
   d. Elongation of polypeptide chains
6. In the process of transcription, the flow of genetic information is from:
   a. DNA to DNA
   b. DNA to protein
   c. RNA to protein
   d. DNA to RNA
7. Another name for reverse transcriptase is:
   a. DNA dependent DNA polymerase
   b. DNA dependent RNA polymerase
   c. RNA dependent DNA polymerase
   d. RNA dependent RNA polymerase

8. Which of the following is transcribed during repression?
   a. Structural gene
   b. Promoter gene
   c. Regulator gene
   d. Operator gene
9. The normal function of restriction endonucleases is to:
   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. The rho (ρ) factor is involved:
   a. To increase the rate of RNA synthesis
   b. In binding catabolite repressor to the promoter region
   c. In proper termination of transcription
   d. To allow proper initiation of transcription

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

11. Briefly describe three types of RNAs involved in protein synthesis (6 marks).
12. Briefly discuss three models of DNA replication (6 marks).
13. With a use of a simple diagram, demonstrate the central dogma of molecular biology (6 marks).
14. Briefly discuss the composition of the nucleic acids (8 marks).
15. Enumerate four enzymes involved in the process of DNA replication (4 marks).

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

16. Discuss the various bonds found in the DNA strand (15 marks).
17. Describe the process of protein biosynthesis (15 marks).
18. Discuss the main causes, classification of DNA mutation and the mechanisms of DNA repair (15 marks).