



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

Main CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**Second YEAR SECOND semester EXAMINATIONS
FOR THE diploma OF MEDICAL LABORATORY SCIENCES**

COURSE CODE: BMD 221 Main Exam

COURSE TITLE: Molecular genetics and technology

DATE: 7th December 2020

TIME: 8.00 -10.00 AM

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**).

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 6 Printed Pages. Please Turn Over.

SECTION A

Answer All Questions (20 Marks).

1. Which one of the following is the most abundant component of RNA?
 - A. mRNA
 - B. rRNA
 - C. tRNA
 - D. sRNA
2. Double helix DNA strand wind up on protein to form a structure called.....
 - A. nucleotide
 - B. nucleosome
 - C. chromatin
 - D. nucleoside
3. which one of the following is a technique for collection of cell from an embryo to test genetic disorder
 - A. PCR
 - B. FISH
 - C. Karyotyping
 - D. Amniostensis
4. Which one of the following is a genetic disease
 - A. Sickle cell anaemia
 - B. albinism
 - C. down's syndrome
 - D. klinefelter's syndrome
5. Which one of the following is the third phase of meiosis cell division?
 - A. Metaphase
 - B. Telophase
 - C. Prophase
 - D. Anaphases
6. If the DNA strand shown below serves as a template for the synthesis of RNA, which of the following choices gives the sequence and direction of the RNA?

5' -GCT ATGCATCGTGATCGAATTGGGT-3'

 - A. 5'-ACGCAATTTCGATCACGATGCATAGC-3'
 - B. 5'-UGCGUUAAGCUAGUGCUACGUAUCG-3'
 - C. 5'-ACGCAAUUCGAUCACGAUGCAUAGC-3'
 - D. 5'-CGAUACGUAGCACUAGCUUAAACGCA-3'
7. Which of the following is the short arm of the chromosome?
 - A. q arm
 - B. p arm
 - C. d arm
 - D. telomere
8. Which one of the following is not RHESUS antigen?
 - A. D
 - B. C
 - C. H

D. E

- 9 The total number of klinefelter's syndrome condition is.....
- A. 45
 - B. 47
 - C. 46
 - D. 44
- 10 The coding regions in an RNA transcript are referred to as:
- A. Introns.
 - B. Exons.
 - C. Splice joints.
 - D. Silencers.
- 11 Which one of the following organelles is involved controlling all activities of the cell?
- A. Mitochondrion.
 - B. nucleus
 - C. Golgi apparatus
 - D. Ribosome
- 12 Which one of the following organelles offer site for transcription process in a cell
- A. nucleus
 - B. ribosome
 - C. cytoplasm
 - D. mitochondrion
- 13 Which one of the following organelles is involved in protein synthesis?
- A. Lysosome
 - B. Golgi bodies
 - C. cytoplasm
 - D. mitochondrion
- 14 Identify the direction of DNA replication
- A. 3' to 5'
 - B. 3' to 3'
 - C. 5' to 3'
 - D. 5' to 5'
- 15 The process of copying a gene's of mRNA to protein is called?
- A. Replication.
 - B. Transcription.
 - C. Translation.
 - D. PCR.
- 16 Which one of the following is a stop codon
- A. GAA
 - B. UAG
 - C. CGA
 - D. UUA.
- 17 Which molecule contains the genetic code that codes for protein?
- A. DNA.
 - B. mRNA.
 - C. tRNA.

D. rRNA.

- 18 The first mRNA codon to specify an amino acid is always.
- A. TAC
 - B. UAA
 - C. UAG
 - D. AUG
- 19 A DNA strand with the sequence AACGTATCG is transcribed. What is the sequence of the mRNA molecule synthesized?
- A. AACGTAACG
 - B. UUGCAUAGC
 - C. AACGUAACG
 - D. TTGCATTGC
20. How many nitrogenous bond forms between Guanine and cytosine?
- A. 2, B. 1, C. 4, D. 3

SECTION B

Answer All Questions (60 Marks).

1. Define the following terms a) Test cross b) dihybrid d) monohybrid c) co dominance d) dominance (10 Marks)
2. Draw well labeled diagram of adenosine -5-triphosphate (ATP) (10 Marks).
4. Using relevant examples, discuss RNA function (6mks)
5. State five genes with their respective product (10mks)
6. State the following: a) Mendel's law 3mks b) stop codon & start codon 4mks c) enzymes/proteins involved in replication 7mks

SECTION C

Answer All

1. Differentiate between meiosis and mitosis cell division and briefly state their advantage. (20 Marks).
2. Discuss nucleic acid (20 Marks).
3. State and briefly discuss five genetic disorders (20Marks)