(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF SCIENCE MEDICAL BIOTECHNOLOGY
MAIN EXAM

COURSE CODE: **BMB 411**

COURSE TITLE: **MOLECULA DIAGNOSTICS**

DATE: **TIME:** 2HOURS

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

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MKS)

Instructions to the candidate

- The section has twenty (20) multiple choice questions (MCQs)
- Each question has a stem and four (4) completion options, of which only one is correct
- Write your answers on the provided university examination booklet.

Choose only ONE option for your correct answer

1) Which of the following factors enhances resolution in gel electrophoresis:
    A) Increase in gel concentration
    B) Decrease in gel concentration
    C) All of the above
    D) None of the above
2) Which of the following is not an application of RFLP?
    A) Used in medico-legal investigations
    B) Used in DNA finger printing
    C) Used in finding DNA mutations
    D) Used in drug discovery.
3) Which of the following entails point mutation?
    A) Non-sense mutation
    B) Frame shift mutation
    C) Silent mutation
    D) All of the above
4) Which of the following is not a protozoan pathogen
    A) Gadia lamblia
    B) Plasmodium
    C) Trypanosoma gabiense
    D) Salmonella Typhy
2) True about pathogens except?
    A) Cause diseases
    B) Are parasites
    C) Include bacteria
    D) None of the above
5) In processing of Bacterial pathogens for Laboratory work up:
    A) Bacteria can be cultured
    B) Serological diagnosis can be used
    C) PCR can be Used
    D) All of the above

6) The following are not a serological methods of disease diagnosis except?
    A) PCR
    B) RFLP
    C) Molecular hybridization
    D) Precipitation reactions
7) Polarization microscope examines:
    A) Dead structures
    B) Birefrigent structures
    C) A and B
    D) All of the above
8) Lac Operon:
    A) Is a regulatory sequence of genes
    B) Regulates Lactose metabolism
    C) Regulates protein metabolism
    D) All the above.
9) Gel filtration chromatography separates molecules based on:
    A) Ionization
    B) Fluorescence
    C) Molecular sizes
    D) None of the above
10) Which one of the following statements attribute to Ion Exchange chromatography
    A) Separation not based on charge
    B) Separation based on affinity
    C) Separation based on charge Separation not based on binding affinity.
    D) Separation based on molecular sizes.
11) Resolution in light microscopy depends on?
    A) Numerical Aperture
    B) Contrast
    C) Dark field
    D) All of the above
12) Which of the following statements does not depict ELISA as a diagnostic tool:
    A) Its highly specific
    B) It is highly sensitive
    C) Based on antigen antibody reaction
    D) None of the above
13) Regarding the demerits of PCR:
    A) Its highly specific
    B) Its highly sensitive
    C) None of the above
    D) All of the above
14) Regarding the principles of light microscopy:
    A) Contrast

B) Magnification
C) Resolution
D) All of the above

15) DNA Methylation occurs at:
a) The CpG islands.
b) Poly A tail.
c) Within the chromatin material.
d) None of the above.

16 Regarding X-chromosome Inactivation ,which one is correct:
a) Is essential in increasing the X-chromosomal genes during inheritance.
b) Is Essential in decreasing X chromosomal genes during inheritance.
c) Is essential in increasing Y chromosomal genes during inheritance.
d) None of the above.

17 Plasmodium Falciparum is a parasitic worm that causes:
a) Giadiasis
b) Malaria
c) HIV 1
d) Septic shock syndrome.

18 Methods of diagnosing Viral pathogens do not include the following, except:
a) Serological
b) Molecular techniques.
c) Culture Techniques
d) All of the above.

19 Not true about CYBR green, except :
a) is used in Staining ss RNA molecules because it does not intercalate with double stranded DNA
b) Is used in staining ss DNA molecules because it does not intercalate with double stranded DNA
c) Is used in staining double stranded DNA molecules because it intercalates with double stranded DNA
d) All the above are true

20. Two dimensional electrophoresis involve:
a) Agarose Gel Electrophoresis and Poly acrylamide Gel electrophoresis
b) Agarose Gel electrophoresis and Isoelectric focusing
c) Polyaccrylamide gel electrophoresis alone.
d) Agarose gel electrophoresis alone.

SECTION B: SHORT ANSWER QUESTIONS (40 MKS)

Instructions

- This section has a total of **FIVE** short answer questions (SAQs), totalling a maximum of forty (40) marks.
- Answer all questions.
- Write your answers on the provided university examination booklet.

1) State and explain various types of clinical specimens and describe ways of processing them (8 marks)
2) State and explain various immunological methods that can be used in diagnosing microbial pathogens (8 marks)
3) Distinguish between the following types of ELISA: Sand-witch ELISA, Direct ELISA and Indirect ELISA (8 marks)
4) Explain how you would diagnose malarial parasites in blood specimen using PCR as a method of choice (8 Marks)
5) Describe the mechanism of gene regulation by Lac Operon (8 marks)

SECTION C: LONG ANSWER QUESTIONS (60 MKS)

Instructions

- This section has **TWO** long answer questions (LAQs), totalling a maximum of forty (60) marks.
- Answer all questions.
- Write your answers on the provided university examination booklet.

1) **Describe how you would prepare a tissue specimen for microscopic examination (20 marks)**

2) **a) State the principle of two dimensional gel electrophoresis (4 marks)**

b) Describe how you would separate a mixture of proteins by two dimensional gel electrophoresis (16 marks)

3. Describe various specimens you would collect for diagnosis of microbial pathogens. (20Marks)