(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)
UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

MAIN EXAM

FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN MEDICAL BIOTECHNOLOGY

COURSE CODE: BMB 316

COURSE TITLE: BIOTECHNIQUES

DATE: TIME:

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over

SECTION A (20 MARKS)

1. Southern hybridization is:
   A. Used to identify a specific protein
   B. Used to identify specific DNA
   C. Used to identify specific RNA
   D. Used to identify both DNA and RNA

2. In electrophoresis, DNA will migrate towards
   A. Cathode or positive electrode
   B. Anode to negative electrode
   C. Cathode or negative electrode
   D. Anode or positive electrode

3. The speed of migration of ions in an electron field depends on:
   A. Magnitude of charge and main of molecule
   B. Magnitude of a charge and shape of the molecule
   C. Shape and size of molecule
   D. Magnitude of charge, shape and mass of molecule

4. Electrophoresis cell or electrophoresis apparatus consists of;
   A. Power park and electrophoresis unit
   B. Electrophoresis unit and DNA separation
   C. Buffer chamber and electrophoresis unit
   D. Gel buffer, chamber and power park

5. The following PCR technique allows measuring the DNA amplitude at each cycle of PCR contrary to end point detection in traditional PCR
   A. QPCR or quantitate PCR
   B. Touch-down PCR
   C. A cytometry PCR
   D. Reverse transcriptase PCR

6. The most efficient PCR technique that uses a print fix to detect deletions or duplication in a large gene is;
   A. Anchored PCR
   B. Nested PCR
   C. Mini printer PCR
   D. Multiplex PCR

7. The sequence recognized by the restriction enzyme to cut the DNA is called
   A. Recognition site
   B. Restriction site
   C. Both a and b
   D. Cleavage site

8. Which of the following is immobilized on the microtiter well in sandwich ELISA?

A. Detection antibody
B. Sample
C. Capture antibody
D. Secondary antibody conjugated to an enzyme

9. ELISA is based on:
   A. Antigen-Antibody interaction
   B. Antigen-Protein interaction
   C. Lectin-Antibody interaction
   D. Antibody-Protein interaction

10. Flow cytometry uses:
   A. Heavy isotope
   B. Radioactive elements
   C. Immunological techniques
   D. Energy content

11. RPM stands for
   A. Round per minutes
   B. Right per minutes
   C. Revolution per minutes
   D. None of the above

12. How are the cells sorted in the flow cytometry?
   A. By dilution plating until there are only single cell in each well of microtiter plate
   B. By the differential weight
   C. By electrostatic force
   D. By magnetic force

13. What immunological cells expresses on Cd4
   A. Helper T cells
   B. Cytotoxic T cells
   C. Granulocytes
   D. Monocytes

14. A primary objective of cell fractionation is
   A. To crack the cell wall so the cytoplasmic contents can be released.
   B. To identify the enzymes outside the organelles.
   C. To view the structure of cell membranes.
   D. To separate the major organelles so their particular functions can be determined.

15. An effective way of purifying liquids containing suspensions is
   A. Crystallization
   B. Decanting
   C. Centrifuging

D. Separating funnel

16. Cell lysis is carried out by which substance?
    A. Lysozyme and detergents
    B. Tri buffer
    C. EDTA buffer solution
    D. Suphuric Acid

17. For, the separation of DNA by electrophoresis which of the following method is commonly used?
    A. Agarose – Vertical
    B. Agarose – Horizontal
    C. PAGE – Vertical
    D. PAGE – Horizontal

18. Restriction enzymes are enzymes
    A. Capable of cutting DNA molecules
    B. Capable of adding nucleotides to the 3'OH end
    C. Capable of restriction protein synthesis
    D. Capable of joining DNA molecules

19. The mechanisms of intake of DNA fragments from the surrounding medium by a cell is called
    A. Transformation
    B. Transduction
    C. Both A and B
    D. Conjugation

20. Electroporation is also used for taking up the DNA by the cells. It constitutes of _____
    A. Inserting the DNA into the cells via an electric shock
    B. Increased efficiency than both natural and chemical methods
    C. Causing the least amount of damage in comparison to other methods
    D. Decreased efficiency than both natural and chemical methods

SECTION B (40 MARKS)

1. Outline and explain FOUR macromolecules separation methods (8 Mks)

2. Make notes on the principles of centrifugation (8 Mks)

3. Briefly explain FOUR technical applications of RT-PCR (8 Mks)

4. Outline steps involved in Northing blotting Technique (8 Mks)

5. Make notes on Gel electrophoresis (8 Mks)

SECTION C (60 MARKS)

1. Explain steps involved in Southern blotting technique (20 Marks)
2. A. Describe the flow cytometry procedure (12 Marks)

   B. Explain FOUR applications of flow Cytometry (8 Mks)
3. A. Describe the working principles of a conventional PCR (15 Marks)

   B. State 5 technical appliances of real time PCR (5 Marks)