



(University of Choice)

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

MAIN CAMPUS

UNIVERSITY EXAMINATIONS (MAIN PAPER)

2023/2024 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

**FOR THE DIPLOMA
IN
MEDICAL BIOTECHNOLOGY / MEDICAL LABORATORY
SCIENCES**

COURSE CODE: DMB/DML 113

COURSE TITLE: CELL STRUCTURE AND BIOLOGY

DATE: 6TH DECEMBER 2023

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

This Paper Consists of 4 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (20 Marks)

1. Cell's power houses are its _____
 - A. Lysosomes
 - B. Mitochondria
 - C. Ribosomes
 - D. Golgi apparatus
2. The hydrophobic part of the phospholipid layer is made up of _____
 - A. Choline
 - B. Phosphate group
 - C. Fatty acids
 - D. Cell surface markers
3. The cytoskeleton is composed of well-defined filamentous structures know as _____
 - A. Chromatin
 - B. Gap junction
 - C. Microfilaments
 - D. Desmosome
4. Membrane occurs in _____
 - A. Chromosomes, nuclei and mitochondria
 - B. Cytoplasm, chloroplasts and mitochondria
 - C. Cytoplasm, nuclei and starch grains
 - D. Chromosomes, chloroplasts and starch grain
5. The RNA has Uracil instead of _____ in its structure
 - A. Adenine
 - B. Guanine
 - C. Cytosine
 - D. Thymine
6. How many bonds are there between G-C base pair?
 - A. Four
 - B. Two
 - C. Three
 - D. One
7. The hydrophobic ends of phospholipid molecules are _____
 - A. Polar
 - B. Non-polar
 - C. Neutral
 - D. Bipolar
8. The discovery that "a section of cork is made up of small cavities surrounded by firm walls" was made by _____
 - A. Robert Hooke
 - B. A. Van Leeuwenhoek
 - C. J.B. Lamarck
 - D. Loewy and Siekevitz

9. Microtubules in cilia and flagella are formed of _____
- A. Actin
 - B. Myosin
 - C. Elastin
 - D. Tubulin
10. The following statements are false regarding the Mesosomes except _____
- A. They are found in Eukaryotic cells
 - B. They contain chlorophyll essential for plant cell growth
 - C. They bear respiratory enzymes
 - D. They cover the cell membrane and assist in cell rigidity just like the cell wall
11. Lysosomes arise from _____
- A. Smooth ER
 - B. Golgi complex
 - C. Both of these
 - D. None of these
12. Nuclear membrane facilitates _____
- A. Synapses of homologous chromosomes
 - B. Nucleocytoplasmic exchange of materials
 - C. Anaphasic separation of daughter chromosomes
 - D. Organization of spindles
13. The following are true regarding eukaryotic cells except _____
- A. Thalakoids occur within the chloroplast
 - B. Sap vacuoles are commonly present
 - C. 80S ribosome's are present
 - D. 70S ribosome's are present
14. A chemical that forms an insoluble complex with the stain and fixes it or causes the stain to penetrate more deeply into the cell is a _____
- A. Fixative
 - B. Mordant
 - C. Accentuater
 - D. Colorizer
15. Chromosomes are best seen in _____
- A. Interphase
 - B. Metaphase
 - C. Prophase
 - D. Telophase
16. Proteins are modified in _____
- A. ER
 - B. Golgi complex
 - C. Both a and b
 - D. Neither in a nor in b

17. The ATPase enzyme is located in the mitochondria in _____
- Oxysomes
 - Outer membrane
 - Inner membranes
 - Matrix
18. The junctions that link cells together into tissues are _____
- Tight junctions
 - Adhesive junctions
 - Gap junctions
 - Plamodesmata
19. One of the following statements is false regarding staining:
- Positively charged radicals combines with negatively charged particles in cytoplasm and gives color in basic stains
 - Acid fast staining property of the genus Mycobacteria depends upon their lipid-rich cell walls
 - May-Grunwald and Leishman stains are examples of acidic differential stains
 - Thickness, density, porosity, chemical composition and integrity of the bacterial cell wall is integral in Gram staining
20. The component of chromosomes that controls heredity is _____
- Proteins
 - RNA
 - DNA
 - Metal ions

SECTION B: Short Answer Questions (40 Marks)

- Tabulate the differences between a Prokaryotic and Eukaryotic cell (8 Marks)
- Describe the three classes of intracellular signaling proteins (8 Marks)
- Discuss the different types of cell junctions (8 Marks)
- Discuss the following organelles: (8 Marks)
 - Golgi apparatus
 - Mitochondrion
 - Plastids
 - Ribosomes
- Discus health and behavioral implications of chromosomal Microdeletions (8 Marks)

SECTION C: Long Answer Questions (60 Marks)

- Discuss the Meiosis phase of cell division stating all the processes involved (20 Marks)
- Describe the fluid mosaic structure of the cell membrane using a well labelled diagram (10mks)
 - Discuss cell diversity and factors limiting cell growth, shape and size (10mks)
- Discuss the various types of microscopes as used in cellular studies (10 Marks)
 - Describe the various types of stains commonly used in the laboratory for cellular studies (10mks)