



(University of Choice)

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

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2023/2024 ACADEMIC YEAR**

**FIRST YEAR FIRST TRIMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN NURSING (DISTANCE  
LEARNING)  
MAIN EXAM**

**COURSE CODE: NCD 111**

**COURSE TITLE: HUMAN ANATOMY 1:CELL BIOLOGY**

**DATE: 8<sup>TH</sup> APRIL 2024**

**TIME: 3PM-6PM**

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**INSTRUCTIONS TO CANDIDATES**

This paper is composed of multiple choice questions please answer all questions by choosing appropriate choice

TIME: 3Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 9Printed Pages. Please Turn Over.

**SECTION A: MULTIPLE CHOICE QUESTIONS (60 MKS)**

1. Who used a compound microscope to see chambers within cork and named them “cells”?
  - A. Anton van Leeuwenhoek
  - B. Robert Hooke
  - C. Matthias Schleiden
  - D. Rudolf Virchow
2. The cell theory states that:
  - A. All cells originate from one cell type
  - B. There are two types of cells
  - C. All organisms are made of cells and cells originate from pre-existing cells
  - D. Chromosomes are aligned in a single plane
3. Who is the probable inventor of the compound microscope?
  - A. Girolamo Fracastoro
  - B. Zaccharias Janssen
  - C. Antonie van Leeuwenhoek
  - D. Robert Hooke
4. In light microscopy, which of the following is used as fixatives prior to staining technique?
  - A. Osmic acid
  - B. Glutaraldehyde
  - C. Heat
  - D. Osmic acid, glutaraldehyde, heat
5. Which part of the light microscope controls the intensity of light entering the viewing area?
  - A. Coarse adjustment screw
  - B. Fine adjustment screw
  - C. Diaphragm
  - D. Condenser lens
6. Which among the following microscopes gives information about external topography of specimen
  - A. Transmission electron microscope
  - B. Scanning electron microscope
  - C. Dark field microscope
  - D. Light microscope
7. What type of microscope uses a cone of light so that light only hits the specimen indirectly, producing a darker image on a brighter background?
  - A. Transmission electron microscope
  - B. Brightfield microscope
  - C. Darkfield microscope
  - D. Phase-contrast microscope
8. Which of the following stains is used in preparing transmission electron specimens?

- A. Methylene blue
  - B. Fluorexsein isothiocyanate
  - C. Uranyl acetate
  - D. Rhodium
9. Looking at a cell under a microscope, you note that it is a prokaryote. How do you know?
- A. The cell lacks cytoplasm
  - B. The cell lacks a cell membrane
  - C. The cell lacks a nucleus
  - D. The cell lacks genetic material
10. Which of the following is a function of the nucleus?
- A. Stores DNA
  - B. Stores sugars
  - C. Builds proteins
  - D. Packages proteins
11. Which of the following is a function of the cytoskeleton?
- A. helps a cell keep its shape
  - B. contains DNA
  - C. surrounds the cell
  - D. helps make proteins
12. Which structures are involved in cell movement?
- A. cytoplasm and ribosomes
  - B. nucleolus and nucleus
  - C. microtubules and microfilaments
  - D. chromosomes
13. A group of similar cells that perform a particular function is called
- A. an organ.
  - B. an organ system
  - C. a tissue
  - D. Epithelial
14. Which organelle would you expect to find in plant cells but not animal cells?
- A. Mitochondrion
  - B. Ribosome
  - C. Chloroplast
  - D. Smooth endoplasmic reticulum
15. The hydrolase enzymes are stored in the:
- A. Peroxisomes
  - B. Secretory vesicles
  - C. Mitochondria
  - D. Lysosomes

16. Which of the following is concerned with the synthesis and transport of lipids and steroids in the cell?
- A. rough ER
  - B. smooth ER
  - C. Golgi apparatus
  - D. Lysosome
17. The mitochondrion is bound by \_\_\_\_\_ membranes.
- A. One
  - B. Two
  - C. Three
  - D. Four
18. The endoplasmic reticulum consists of tubular membrane and flattened sacs known as
- A. Cristae
  - B. Cisternae
  - C. Lumen
  - D. Late endosomes
19. Which cell organelle is involved in apoptosis?
- A. Lysosome
  - B. ER
  - C. Golgi
  - D. Mitochondria
20. Respiration reactions involved in oxidation of sugars occur in the
- A. Ribosomes
  - B. Lysosomes
  - C. Mitochondria
  - D. Peroxisomes
21. Phagocytosis is the process of:
- A. Internalizing particles by a cells
  - B. Particles leave the cell
  - C. Internalization of extracellular fluid
  - D. Fluid leaves the cell
22. The cytoskeleton is composed of well-defined filamentous structures know as
- A. Chromatin
  - B. Gap junction
  - C. Microfilaments
  - D. Desmosome
23. What is the function of the cell membrane?
- A. To control the substances that enter and leave the cell
  - B. To carry out respiration
  - C. To contain the genetic information

- D. To synthesise proteins
24. Microfilaments are composed of a protein called
- A. Tubulin
  - B. Actin
  - C. Myosin
  - D. Chitin
25. One of the following is a function of epithelial tissue. Which one is it?
- A. Internal support for organs
  - B. Protection from external environment
  - C. Stores nutrients
  - D. Contracts to produce movement
26. Which of the following is an element of connective tissue?
- A. Brain
  - B. Spinal cord
  - C. Ground substance
  - D. Nerves
27. Which of the following is an element of the nervous tissue?
- A. Fibroblasts
  - B. Fibers
  - C. Ground substance
  - D. Brain
28. The main function of the connective tissue is.
- A. Protection from external environment
  - B. Absorption
  - C. Filters the kidney
  - D. Internal support for organs
29. The hydrophobic part of the phospholipid layer is made up of:
- A. Choline
  - B. Phosphate group
  - C. Fatty acids
  - D. Cell surface markers
30. The fluidity of the plasma membrane increases with
- A. Increase in unsaturated fatty acids in the membrane
  - B. Increase in saturated fatty acids in the membrane
  - C. Increase in glycolipid content in the membrane
  - D. Increase in phospholipid content in the membrane
31. Which among the following defines GPI anchored proteins?
- A. Integral proteins of the plasma membrane
  - B. Peripheral proteins of the plasma membrane
  - C. Proteins that bind to ion-gated channels in the plasma membrane

- D. Proteins which randomly bind to lipids of the plasma membrane
32. Glycolipids in the plasma membrane are located at
- Inner leaflet of the plasma membrane
  - The outer leaflet of the plasma membrane
  - Evenly distributed in the inner and outer leaflets
  - It varies according to cell types
33. According to the fluid mosaic model of membrane structure, proteins of the membrane are mostly:
- Spread in a continuous layer over the inner and outer surfaces of the membrane
  - Confined to the hydrophobic core of the membrane
  - Embedded in a lipid bilayer
  - Randomly oriented in the membrane, with no fixed inside-outside polarity
34. Which of the following types of molecules are the major structural components of the cell membrane?
- Phospholipids and cellulose
  - Nucleic acids and proteins
  - Phospholipids and proteins
  - Proteins and cellulose
35. Which one of the following is not a major component of the cell surface membrane?
- Glycolipid
  - Glycoprotein
  - Cholesterol
  - triglyceride
36. Chromosomes are found in the-----of the cells
- Nucleus
  - The cytoplasm
  - The cytoplasm and nucleus
  - The mitochondrion
37. The oxygen and carbon dioxide crosses the plasma membrane by the process of
- Active diffusion
  - Facilitated diffusion
  - Passive diffusion
  - Random diffusion
38. Potassium cyanide interferes with the formation of ATP. The use of potassium cyanide reduces the rate at which molecules of a certain chemical enter the cell. Select the process by which the molecules would normally enter the cell.
- Simple diffusion
  - Facilitated diffusion
  - Osmosis
  - Active transport

39. Which of the following transport processes will form a vesicle?
- A. Diffusion
  - B. Facilitated diffusion
  - C. Osmosis
  - D. Phagocytosis
40. Chromatid is a?
- A. one of the strands or arms of a chromosome
  - B. the point of attachment of two strands of a chromosome
  - C. a chromosome before it becomes visible during cell division
  - A. is a karyotype
41. The phagocytosed food is digested with the help of enzymes which are present in
- A. Ribosome
  - B. Lysosomes
  - C. Mitochondria
  - D. Golgi complex
42. Which of these describe the process of mitosis?
- A. Two haploid daughter cells are produced
  - B. Four diploid daughter cells are produced
  - C. Two diploid daughter cells are produced
  - D. Four haploid daughter cells are produced
43. The function of the centrosome is
- A. Formation of spindle fibres
  - B. Osmoregulation
  - C. Secretion
  - D. Protein synthesis
44. The normal human chromosome diploid number is:
- A. 23
  - B. 24
  - C. 46
  - D. 48
45. The variation in gene is known as:
- A. An allele
  - B. Locus
  - C. Genotype
  - D. phenotype
46. Which of the following is an example of monosomy?
- A. 46,XX
  - B. 47,XXX
  - C. 69,XYY
  - D. 45,X

47. Which of the following nitrogenous bases is found in DNA but is not found in RNA?
- A. Adenine
  - B. Guanine
  - C. Cytosine
  - D. Thymine
48. One of the following statements CORRECTLY describes Metaphase, which one is it?
- A. Chromosomes arrive at the poles
  - B. The sister chromatids separate and move toward opposite spindle poles
  - C. The nuclear membrane reforms around each set of chromosomes producing two separate nuclei within the cell
  - D. The chromosomes are aligned along a single plane
49. Identify the direction of DNA replication
- A. 3' to 5'
  - B. 3' to 3'
  - C. 5' to 3'
  - D. 5' to 5'
50. Nucleotides have a nitrogenous base attached to a sugar at the:
- A. 1' carbon
  - B. 3' carbon
  - C. 4' carbon
  - D. 5' carbon
51. It is difficult to observe individual chromosomes with a light microscope during prophase because
- A. The DNA has not been replicated yet.
  - B. They are uncoiled in long, thin strands.
  - C. They leave the nucleus and are dispersed to other parts of the cell.
  - D. Sister chromatids do not pair up until division starts.
52. In meiosis, recombination occurs in:
- A. Metaphase I
  - B. Prophase I
  - C. Metaphase II
  - D. Prophase II
53. The name of the sugar found on an RNA molecule is called
- A. Pentose
  - B. Deoxyribose
  - C. Ribose
  - D. Phosphate group
54. The nucleotides are joined by linking the phosphate on chromosome number
- A. 1'
  - B. 3'

- C. 5'
  - D. 2'
55. A group of three bases that specify an amino acid is known as
- A. Genetic code
  - B. Codon
  - C. Start signal
  - D. Central dogma
56. Which of the following is a start codon
- A. AUG
  - B. GAG
  - C. UAG
  - D. GAA
57. The reversible replacement of one differentiated cell type with another mature differentiated cell type is known as
- A. Atrophy
  - B. Hyperplasia
  - C. Metaplasia
  - D. Dysplasia
58. The junctions that link cells together into tissues are
- A. Tight junctions
  - B. Adhesive junctions
  - C. Gap junctions
  - D. Plamodesmata
59. Which of the following is NOT a microdeletion syndrome
- A. Wialliams-Bauren syndrome
  - B. Prader-Willi syndrome
  - C. Turner's syndrome
  - D. Angleman syndrome
60. \_\_\_\_\_ syndrome involves the inheritance of extra chromosomal 21 material
- A. Downs Syndrome
  - B. Turner's syndrome
  - C. XXY syndrome
  - D. Prader-Willi syndrome

**SECTION B: SHORT ANSWER QUESTIONS (20 MARKS)**

1. With the aid of a well-labeled diagram describe the structure of a plasma membrane (5 Marks)
2. State four types of cellular adaptation (4 Marks)

3. State five patterns of inheritances according to exceptional laws

**(5 Marks)**

4. Describe the process of protein synthesis

**( 6 Marks)**

**SECTION C: LONG ANSWER QUESTIONS (20 MARKS)**

1. Explain ten(10) applications of genetics in health care

**(20 Marks)**