



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

**UNIVERSITY SPECIAL/SUPPLEMENTARY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**FIRST YEAR, SECOND TRIMESTER EXAMINATION
FOR THE DEGREE OF
BACHEOR OF SCIENCE IN CLINICAL MEDICINE, SURGERY & COMMUNITY
HEALTH, PHYSIOTHERAPY & MEDICAL EDUCATION**

COURSE CODE: BIO 112/HCM 120

COURSE TITLE: MEDICAL BIOCHEMISTRY II

DATE: Friday 27th August 2021

TIME: 11:00 AM – 2:00PM

INSTRUCTIONS TO CANDIDATES

Answer All Questions

Section A: Multiple Choice Questions (MCQs)	20 Marks.
Section B: Short Answer Questions (SAQs)	40 Marks.
Section C: Long Answer Question (LAQs)	40Marks

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

Section A: Multiple Choice Questions (MCQs) (20 MARKS)

1. **Drugs which undergo high degree of fast pass metabolism in the liver:**
 - A. Have low oral bioavailability
 - B. Are excreted primarily in bile
 - C. Are contraindicated in liver disease
 - D. Exhibit zero order kinetics of elimination

2. **Biotransformation of drugs is primarily directed to:**
 - A. Activate the drug
 - B. Inactivate the drug
 - C. Convert non-lipid soluble drugs into lipid soluble metabolites
 - D. Convert lipid soluble drugs into non-lipid soluble metabolites

3. **The most commonly occurring conjugation reaction for drugs and their metabolites is:**
 - A. Acetylation
 - B. Methylation
 - C. Glucuronidation
 - D. Glutathione conjugation

4. **Induction of drug metabolizing enzymes involves:**
 - A. Conformational change in the enzyme protein to favor binding of substrate molecules
 - B. Expression of enzyme molecules on the surface of hepatocytes
 - C. Enhanced transport of substrate molecules into hepatocytes
 - D. Increased synthesis of enzyme protein

5. **The following drug metabolizing reaction is entirely non-microsomal:**
 - A. Glucuronide conjugation
 - B. Acetylation
 - C. Oxidation
 - D. Reduction

6. **Which of the following corona viruses has caused thousands of deaths around the world as an "emergent" virus:**
 - A. MERS
 - B. OC43
 - C. SARS
 - D. HKU1

7. **Many viral infections result in immune pathology, this is caused predominantly by which of the following:**
 - A. A cytokine storm
 - B. Antibody mediated reactions
 - C. A response of killer T cells (CD-8)

- D. A decline in function of the immune system
8. **What is the most common mechanism for a virus to kill a cell:**
- A. Dissolves the cellular membrane
 - B. Induces apoptosis via caspases
 - C. Fragments cellular DNA
 - D. Totally blocks cellular transcription
9. **The characteristic properties of cytokines are:**
- A. Pleiotrophy and redundancy
 - B. Synergy and antagonism
 - C. Cascade induction and amplification
 - D. All the above
10. **Which type of molecule is produced by virus-infected cells to communicate to non-infected cells the presence of a virus:**
- A. Complement
 - B. Interleukin
 - C. Interferon
 - D. Lymphokine
11. **How does the papilloma family of viruses cause cancer:**
- A. Integrates viral genome into cellular DNA
 - B. Replicate in dividing cells and encodes three oncogenic proteins E5, E6 and E7
 - C. Has an oncogene able to initiate cancer
 - D. Acts as a cofactor for a cellular oncogene
12. **Which of the following is TRUE of prions:**
- A. They can be inactivated by boiling at 100⁰c
 - B. They contain a capsid
 - C. They are a rogue form of protein, PrP
 - D. They can be reliably inactivated by an autoclave
13. **The stage of meiosis in which chromosomes pair and cross over is:**
- A. Metaphase I
 - B. Prophase I
 - C. Metaphase II
 - D. Anaphase
14. **The idea that for any particular trait, the pair of alleles of each parent separate and only one allele from each parent passes to an offspring is Mendel's principle of:**
- A. Independent assortment
 - B. Hybridization
 - C. Segregation
 - D. Codominance

15. A mutation in a codon leads to the substitution of one amino acid with another. What is the name of this type of mutation:
- A. Nonsense mutation
 - B. Missense mutation
 - C. Frameshift mutation
 - D. Promoter mutation
16. Mitochondrial DNA is advantageous for evolutionary studies because:
- A. It first appeared in humans and is not found in other animals
 - B. It is inserted into the X chromosome
 - C. It evolves more slowly than the genes in the nucleus
 - D. It is inherited only through the female parent and thus evolves in a way that allows trees of relationship be easily constructed
17. What is the name for the transfer of genetic information from one bacterium to another bacterium by a phage:
- A. Transformation
 - B. Conjugation
 - C. Transduction
 - D. Penetration
18. Simple tandem repeat polymorphisms in humans are most useful for:
- A. Estimating matches for blood transfusion
 - B. Solving criminal and paternity cases
 - C. Transferring disease resistance factors in bone marrow cells
 - D. Reconstructing relationships of humans, chimps and Neanderthals
19. The polymerase chain reaction or PCR is a technique that:
- A. Is used to demonstrate DNA as the genetic material
 - B. Detects the level of polymerases involved in replication
 - C. Uses short DNA primers and a thermostable DNA polymerase to replicate specific DNA sequences *in vitro*
 - D. Measures the ribosome transfer rate during translation
20. RFLP analysis is a technique that:
- A. Is used to amplify genes for producing useful products
 - B. Is used to detect genetic variation at the protein level
 - C. Measures the transfer frequency of genes during conjugation
 - D. Uses hybridization to detect specific DNA restriction fragments in genomic DNA

Section B: Short Answer Questions (SAQs) (40 MARKS)

1. a) Enumerate five (5) Properties of Prions (5 marks)
b) Briefly explain atleast five (5) Properties of Cytokines (5 marks)
2. Briefly discuss the Factors Affecting Drug Metabolism (10 marks)
3. Describe any five (5) distinct structural characteristics displayed by Gram-negative and Gram-positive bacteria (10 marks)
4. a) Briefly discuss the Control of Gene Expression/Gene Regulation (5 marks)
b) Explain five (5) different types of Horizontal DNA Uptake (5 marks)

Section C: Long Answer Questions (LAQs) (40 MARKS)

1. a) List and Explain the Stages of the Cell Cycle (10 marks)
b) Discuss atleast five (5) Mechanisms Predisposing to Cancer (10 marks)
2. a) Describe the Components and Specific functions of the Virus Structure (10 marks)
b) Using Relevant Examples, perform Virus Classification recommended by the International Committee on the Nomenclature of Viruses (ICNV) (10 marks)

