1022

*(University of Choice)*

# MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)
# UNIVERSITY EXAMINATIONS (MAIN PAPER) 2023/2024 ACADEMIC YEAR

## THIRD YEAR FIRST SEMESTER EXAMINATIONS

## FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES AND MEDICAL BIOTECHNOLOGY

**COURSE CODE:** **BML 315**

**COURSE TITLE:** **FUNDAMENTALS OF PHARMACOLOGY**

**DATE: 7TH DECEMBER 2023** **TIME: 8.00-10.00AM**

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**INSTRUCTIONS TO CANDIDATES**

This paper is divided into three sections, **A B** and **C,** carrying respectively: 20 Multiple Choice Questions (**MCQs**), 8 Short Answer Questions (**SAQs**) and 3 Long Answer Questions (**LAQs**). Answer all questions. **DO NOT WRITE ON THE QUESTION PAPER**

**TIME:** 2 Hours

**SECTION A: Multiple Choice Questions (20 Marks)**

1. Drugs that are administered IV.....
   A. Are rapidly absorbed
   B. Are subject to first-pass metabolism
   C. Have 100% bioavailability
   D. Are rapidly metabolized by the liver
2. Most drugs gain entry to cells by.....
   A. Passive diffusion with zero-order kinetics
   B. Passive diffusion with first-order kinetics
   C. Active transport with zero-order kinetics
   D. Active transport with first-order kinetics
3. Drug biotransformation/metabolism takes place primarily in the.....
   A. Liver
   B. Heart
   C. Kidneys
   D. lungs
4. Which one of the following cholinomimetics activates both muscarinic and nicotinic receptors?
   A. Lobeline
   B. Pilocarpine
   C. Nicotine
   D. Bethanechol
5. Which one of the following is caused by parasympathomimetic drugs?
   A. Bronchodilation
   B. Mydriasis
   C. Bradycardia
   D. Constipation
6. Which of the following directly-acting cholinomimetics has mainly muscarinic activity?
   A. Bethanechol
   B. Carbachol
   C. Acetylcholine
   D. Atropine
7. Indirectly-acting cholinomimetic agents produces cholinergic effects by.....
   A. Binding to and activation of muscarinic or nicotinic receptors
   B. Inhibiting hydrolysis of endogenous acetylcholine
   C. Stimulating the action of acetylcholinesterase
   D. Inhibiting the release of acetylcholine from storage sites
8. Which one of the following drugs is a cholinesterase activator?
   A. Pralidoxime
   B. Edrophonium
   C. Pilocarpine
   D. Isoflurophate
9. Which one of the following is an indirectly-acting sympathomimetics?
   A. Epinephrine
   B. Norepinephrine
   C. Ephedrine

D. Methoxamine

10. Which of the following is not a selective COX 2 non-steroidal anti-inflammatory drug (NSAID)?
    A. Celecoxib
    B. Etoricoxib
    C. Rofecoxib
    D. Ibuprofen
11. Which one of the following drugs is not a non-steroidal anti-inflammatory drug (NSAID)?
    A. Flurbiprofen
    B. Ketoprofen
    C. Dexketoprofen
    D. Dexamethasone
12. Which one of the following is classified as an antihyperlipidemic agent?
    A. Furosemide
    B. Diclofenac
    C. Artovarstatin
    D. amiloride
13. Which one of the following is not a local anaesthetic agent?
    A. Lidocaine
    B. Propofol
    C. Bupivacaine
    D. Mepivacaine
14. Which one of the following is not an expected pharmacological response of an histamine 2 ($H_2$) antagonist?
    A. Increased gastric secretion
    B. Decreased gastric secretion
    C. Increased heart rate
    D. Increased myocardial infarction
15. Which of the following is an example of pharmacodynamics drug-drug interaction?
    A. Tetracycline + ferrous sulphate
    B. Ethanol + metronidazole
    C. Rifampicin + dolutegravir
    D. Diazepam + phenobarbitone
16. Which one of the following is an example of pharmacokinetic drug-drug interaction?
    A. Tetracycline + magnesium containing anatacids
    B. Ethanol + metronidazole
    C. Rifampicin + dolutegravir
    D. Diazepam + phenobarbitone
17. Which one of the following is classified as a gaseous general anaesthetic?
    A. Isoflourane
    B. Lidocaine
    C. Ketamine
    D. Propofol
18. Which one of the following is classified as a non-steroidal anti-inflammatory drug (NSAID)?

A. Prednisolone
B. Ibuprofen
C. Naloxone
D. Morphine

19. Which one of the following enzymes is involved in the hydrolytic degradation of cAMP?
    A. Adenylyl cyclase
    B. Protein kinase
    C. Guanylyl cyclase
    D. Phosphodiesterase
20. Which one of the following is the neurotransmitter involved in impulse transmission in the postganglionic neurons in the sympathetic division of the autonomic nervous system?
    A. Acetylcholine
    B. 5- Hydroxytryptamine
    C. Noradrenaline
    D. Glutamate

**SECTION B: Short Answer Questions (40 Marks)**

1. Define the following pharmacokinetic parameters.
    a. Elimination half-life ($t_{½}$) (1mark)
    b. Volume of distribution ($V_d$) (1mark)
    c. Clearance (Cl) (1mark)
    d. Steady stead concentration (1mark)
    e. Bioavailability (1mark)
2. Outline five general ways to avoid or minimize adverse drug reactions among patients. (5marks)
3. List five signs and symptoms of toxicity due acetylcholinestrase inhibitors. (5marks)
4. Outline five types of adrenoceptors and outline their mechanisms of action. (5marks)
5. State factors that affect absorption of orally administered drugs. (5marks)
6. Explain how urine pH affects excretion of acidic and basic drugs. (5marks)
7. Explain five factors that are considered when selecting the most suitable route of drug administration. (5marks)
8. Enumerate five groups of patients that are at high risk of adverse drug reactions and ways of minimizing occurrence of such adverse reaction. (5 marks)

**SECTION C: Long Answer Questions (60 Marks)**

1. A coated tablet X is administered orally, describe four key pharmacokinetic processes which the drug undergo over the course of time and the key factors affecting each of these processes (20 marks)
2. Discuss the parenteral routes of drug administration, including specific advantages and disadvantages of each route (20Marks)
3. A) Describe the key steps of adrenergic neurotransmission. (6 marks)
   B) Discuss the pharmacological effects of a non-selective muscarinic receptor antagonist in any SEVEN organs or systems . (14 marks)