SO

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

UNIVERSITY EXAMINATIONS (MAIN PAPER) 2023/2024 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DIPLOMA IN MEDICAL BIOTECHNOLOGY

COURSE CODE: BBD 315

COURSE TITLE: PRINCIPLES OF PHARMACOLOGY AND TOXICOLOGY

DATE: 8TH 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 (20Marks)

1. Which one of the following is a phase one reaction?
   A. Reduction.
   B. Acetylation.
   C. Glucuronidation.
   D. Methylation.
2. With regard to a drug_____
   A. LD50 is 50% of the dose necessary to kill experimental animals
   B. Efficacy is the maximum response produced by a drug
   C. Spare receptors are present if Kc50 is the same as EC50
   D. Potency is the same as affinity
3. Regarding biotransformation----------
   A. Phase one reactions always precede phase two reactions
   B. Skin is an organ involved in drug biotransformation
   C. Water conjugation is a phase one reaction
   D. CYP2D6 accounts for the majority of P450 activity
4. Which of the following receptor - ligand pathway is correct?
   A. Insulin - G protein receptor
   B. Mineralocorticoid - tyrosine kinase receptor
   C. Vitamin D - intracellular receptor
   D. Adrenaline - ligand gated channel receptor
5. The metabolic pathway of detoxification that become increasingly important in paracetamol toxicity is_____
   A. Conjugation with glucuronide
   B. Reduction
   C. Methylation
   D. Cytochrome p450 dependent glutathione conjugation
6. which one of the following drugs does not enhance other drug metabolism?
   A. Rifampicin
   B. Ketoconazole
   C. Phenobarbital
   D. Griseofulvin
7. Regarding pharmacology principles_____
   A. Diffusion is directly proportional to thickness and inversely proportional to surfacearea
   B. LD50 - 50% of the dose that kills most people
   C. Efficacy is the maximum response produced by a drug
   D. A partial agonist is always less potent than a full agonist
8. 2mL of 0.5% wv is equal to_____
   A. 1mg
   B. 10mg
   C. 100mg
   D. 20mg
9. What is an example of a phase II biotransformation?
   A. Oxidation
   B. Reduction

C. Glycolysis
D. None of the above.

10. Regarding enzyme induction
    A. It is irreversible
    B. It takes 4 months to develop
    C. Causes increase in smooth endoplasmic reticulum
    D. Causes increase in rough endoplasmic reticulum
11. Clearance is proportional to liver blood flow
    A. True
    B. False
12. Volume of distribution_____
    A. Is inversely proportional to clearance
    B. Is used to work out the maintenance dose
    C. Is high in warfarin
    D. Is proportional to half life
13. For a specific effect, drug A is more potent than drug B. It follows that_____
    A. Drug B is a partial agonist acting at the same receptor as drug A
    B. Drug A causes a greater maximal effect than drug B
    C. When present in identical concentrations, drug A causes a greater effect than drug B
    D. Drug A has a lower ED50 than drug B
14. Regarding receptors, which one of the following statements is not true?
    A. They largely determine quantitative relations between dose of a drug and pharmacologic effect
    B. They are responsible for selectivity of a drug reaction
    C. Mediate actions of pharmacologic antagonists
    D. Spare receptors produce effect without the need for a drug
15. Regarding elimination kinetics, which one of the following statements is incorrect?
    A. In first-order kinetics, the rate of elimination is directly proportional to drug concentration
    B. Ethanol displays dose-dependent kinetics
    C. In zero-order kinetics, the rate of elimination is constant
    D. Most drugs display first-order kinetics
16. Which one of the following drug metabolising systems has been shown to differ in populations in genetically pre-determined ways?
    A. Reductions
    B. Acetylations of amines
    C. Methylation
    D. Glucuronidation
17. Phase II reactions in metabolic biotransformation include all of the following except_____
    A. Water conjugation
    B. Cytochrome P-450 dependent oxidations
    C. Acetylation
    D. Methylation
18. Receptor antagonists----------
    A. Prevent agonists from binding to antagonists
    B. Progressively inhibit agonist response to decreasing concentrations of antagonist
    C. Cannot be negated at high doses of agonists

D. Inhibit receptors to a degree proportionate to antagonist concentration

19. Regarding second messengers_____
    A. cAMP has no role in calcium homeostasis
    B. cAMP exerts most of its effects by stimulating cAMP-dependent protein kinases
    C. inhibition of adenylyl cyclase results in increased cAMP
    D. phospholipase C is situated in the cell nucleus
20. Therapeutic index (TI) is_____
    A. A ratio used to evaluate the safety and usefulness of a drug for indication
    B. A ratio used to evaluate the effectiveness of a drug
    C. A ratio used to evaluate the bioavailability of a drug
    D. A ratio used to evaluate the elimination of a drug

SECTION B: Short Answer Questions (40 Marks)

1. Describe types of drug transportation through membranes (8 Marks).
2. a). Describe two main classes of routes of drug administration (2 Marks).
   b). state the advantages and disadvantages in oral route of drugs administration (6Marks).
3. The aim of pre - clinical development of drug is to satisfy all the requirements before the compound to be ready for testing in humans for the very first time. The work falls into four categories. Describe these categories as applied in Pre - clinical stage (8 Marks).
4. Describe the main ways of drug elimination from the body (8 Marks).
5. Describe the sources of drugs (8 Marks).

SECTION C: Long Answer Questions (60 Marks).

1. Discuss the main aspects covered in the four stages of **clinical trial** in the process of drug development (20 Marks).
2. a) Classify parasympathominetics giving two examples of each class (6 Marks).
   b) Discuss in details the use of drugs in treatment of **Lead poisoning** (14 Marks).
3. Discuss the **routes** of drug administration (20 Marks).