ccNATIONAL UNIVERSITY OF LESOTHO
BACHELOR OF NURSING SCIENCE EXAMINATION
NRS 2303 PHARMACOLOGY FOR NURSES I

SUPPLEMENTARY EXAMINATION

AUGUST 2023 **MARKS: 100** **TIME: 3 HRS**

INSTRUCTIONS:

1. Read instructions carefully
2. Answer **all** questions

SECTION A

This section consists of three questions; answer all questions from this section.

QUESTION 1

Choose the most correct answer to the flowing questions. Simply write e.g. 2. B

1. Which of the following statements best describes pharmacodynamics?
   A. The study of how drugs reach their target in the body and how the levels of a drug in the blood are affected by absorption, distribution, metabolism and excretion.
   B. The study of how drugs can be designed using molecular modelling based on a drug's pharmacophore.
   C. The study of how a drug interacts with its target binding site at the molecular level.
   D. The study of which functional groups are important in binding a drug to its target binding site and the identification of a pharmacophore.

2. Which of the following statements best describes pharmacokinetics?
   A. The study of how drugs reach their target in the body and how the levels of a drug in the blood are affected by various factors.
   B. The study of how drugs can be designed using molecular modelling based on a drug's pharmacophore.
   C. The study of how a drug interacts with its target binding site at the molecular level.
   D. The study of which functional groups are important in binding a drug to its target binding site and the identification of a pharmacophore.

3. Which of the following are driving force in drug movement in aqueous diffusion model?
   A. Active transport-- energy requiring
   B. Facilitated transport
   C. Drug concentration gradient
   D. Pharmacodynamics

4. Which of the following characteristics is detrimental to oral activity?
   A. Stability to digestive enzymes
   B. Susceptibility to metabolic enzymes
   C. Stability to stomach acids
   D. Solubility in both aqueous and fatty environments

5. From the following list select the items associated with adverse drug reaction
   A. Noxious drug response
   B. Unintended response to a drug
   C. Reaction occurs to properly prescribed drug (normal dose or amount)
   D. Medical errors (miscalculation of dose)
   E. Confusion with name of drug prescribed (sounds similar to other drugs)

6. By which of the following routes of administration is insulin usually taken?
   A. Oral
   B. Subcutaneous
   C. Intramuscular
   D. Rectal

7. Which of the following routes of administration should a dental patient use for a nicotine patch?
   A. Oral
   B. Topical
   C. Transdermal
   D. Rectal

8. Nitroglycerin tablets are taken
   A. Sublingually.
   B. Transdermally.
   C. Topically.
   D. Intramuscularly.

9. Oraqix is a local anesthetic applied subgingival. Which of the following routes of drug administration is used to deliver the anesthetic?
   A. Topical
   B. Oral
   C. Transdermal
   D. Parenteral

10. Pharmacokinetics involves all of the following concepts?
   A. Absorption
   B. Distribution
   C. Metabolism
   D. Elimination

11. Which of the following terms is used for metabolism?
   A. Biotransformation
   B. Excretion
   C. Liberation
   D. Elimination

12. Which of the following terms describes how much of a drug will be available in the body to produce a pharmacologic response after it is administered?
   A. Bioequivalence
   B. Bioavailability
   C. Biotransformation
   D. Liberation

13. Absorption is bypassed if a drug is administered by which route?
    A. Topical
    B. Inhalation
    C. Intravenous
    D. Rectal

14. Which of the following drug characteristics will increase the tendency of a drug to cross cell membranes?
    A. Ionized and high lipid solubility
       Nonionized and high lipid solubility
    B. Nonionized and low lipid solubility
    C. Ionized and low lipid solubility

15. How many half-lives does it take for a drug to be eliminated from the body?
    A. 1–2
    B. 2–3
    C. 4–5
    D. 5–6

16. Sublingual or buccal administered drugs must initially be able to go through the
    A. Epithelium of the oral mucosa (tongue or buccal mucosa).
    B. Connective tissue of the GI tract.
    C. Tissues of the stomach.
    D. Tissues of the nasopharynx.

17. Which of the following routes of drug absorption into the bloodstream is most common?
    A. Passive diffusion
    B. Active transport
    C. Facilitated diffusion
    D. Protein transport

18. All of the following alter the rate of absorption of drugs except one. Which one is the exception?
    A. Fatty foods
    B. Blood flow to the target organ
    C. Hydrogen ion concentration
    D. Surface area of the esophagus

19. Orally administered drugs must pass through the liver (via the hepatic portal vein) prior to reaching general circulation and site of action. This is referred to as
    A. Enterohepatic circulation.
    B. First-pass metabolism.
    C. Passive diffusion.
    D. Distribution.

20. Which of the following processes is NOT involved in the concept of pharmacokinetics?
    A. Absorption
    B. Administration
    C. Elimination
    D. Metabolism

21. A client is to receive 100mg of gentamycin injection. On hand is an ampoule containing 80mg/ml of the drug. How many milliliters of the drug should be given to the patient?
    A. 1.5mls
    B. 1.25mls
    C. 1.0mls
    D. 2.0mls

22. A total of 1000mls of dextrose water is to be infused over eight (8) hours. The drop factor of the giving set is 20drps/ml. At what rate should this fluid be given?
    A. 6drps/min
    B. 55drps/min
    C. 42drps/min
    D. 400drps/min

23. You have vial containing 5grms of streptomycin injection. The average dose given is 1000mg. How many doses are available in this vial?
    A. 3 doses
    B. 4 doses
    C. 5 doses
    D. 6 doses

24. Which of the following modifies the efficacy and choice of the drug dose?
    A. The basal metabolic rate
    B. Age
    C. Placebo effect
    D. All of the above

25. The route of administration of a drug can have profound effects on:
    A. The onset of action of the drug.
    B. The plasma concentration achieved.
    C. The length of time the drug will spend in the body.
    D. All of the above.

26. The following are types of drug interaction EXCEPT:
    A. Mechanism of action
    B. Agonism
    C. Antagonism
    D. Synergism

27. A drug has an intrinsic clearance of 40,000 L/min. The plasma protein binding and liver blood flow are 60% and 80 L/h, respectively. Calculate the hepatic clearance.
    A. 80 L/h
    B. 35 L/h
    C. 48 L/h
    D. 320 L/h

28. An investigational new drug is eliminated entirely by hepatic metabolism, with a clearance of 1 L/h in healthy subjects. Assume an average liver blood flow of 80 L/h in these healthy subjects. What would be the expected clearance in a congestive heart failure patient with a liver blood flow of 66 L/h? Use the most appropriate relationships.
    A. 0.83 L/h
    B. 1.0 L/h
    C. 0.66 L/h
    D. 66 L/h

29. Which of the following drugs is found on an emergency trolley?

    A. Phenytoin
    B. Adrenalin
    C. Atropine
    D. All of the above

30. A new analysis technique has enabled you to measure the drug concentration before and after the blood passes the liver. The plasma concentrations before and after the liver was passed were 6.5 and 2.4 mg/mL, respectively. Calculate the hepatic clearance (assume a liver blood flow of 1450 mL/min).
    A. 15 L/h
    B. 35 L/h
    C. 55 L/h
    D. 75 L/h **(30 Marks)**

QUESTION 2

Match the term in column A with the correct definition in column B. only write; e.g. 1. B.

Column A	Column B
2.1 Adverse effect	A. This is the effect which we do not want to have but are non-deleterious such as dry mouth with atropine which treat the spasm of intestine.
2.2 Side effect	B. This means noxious effects induced by over dosage of drugs or accumulation of large amount of drugs.
2.3 Allergy	C. The effect still exists, after withdrawal of the drug, the drug concentration is below the threshold, such as, the patient feels hangover next morning, after taking barbiturates.
2.4 Toxic effect	D. It is an adverse reaction that result from previous sensitization to a particular chemical or to one that is structurally similar. Such reactions are mediated by the immune system.
2.5 After effect	E. It is any response to drug that is noxious and unintended and that occurs at doses used in man for prevention, diagnosis and therapy of a disease, or for the modification of physiological function.

(5 Marks)

QUESTION 3

Indicate whether the following statements are **True** or **False** in Pharmacology. Simply write e.g. 1. True/False.

3.1 After a drug is taken orally, it immediately passes into the bloodstream.

3.2 Cell membranes are composed of three layers of fat.

3.3 A drug that is soluble in fat is called hydrophilic.

3.4 Passive diffusion of drugs across cell membranes/tissue barriers does not require energy.

3.5 A lipophilic drug is more easily excreted in the urine.

3.6 Weak acids such as aspirin are more readily absorbed from the stomach than weak bases.

3.7 Drugs that are weak bases (e.g., erythromycin, codeine, and morphine) are more lipid soluble and have greater absorption in the small intestine.

3.8 Morphine has to be injected because it has a high first-pass metabolism.

3.9 Polar drugs that are not metabolized are excreted unchanged in the urine.

3.10 Drug dose is defined as the quantity of drug administered.

3.11 A drug that is administered intravenously has 100% bioavailability.

3.12 Plasma contributes 5% of the total body mass.

3.13 Volume of distribution is a hypothetical volume required to contain all drug in tissues at consistent concentration.

3.14 Penicillin, azithromycin, and erythromycin do not affect the foetus and can be used during the pregnancy.

3.15 Metabolism includes chemical alteration of the drugs in the body.

(15 Marks)

QUESTION 4

a) Drugs are derived from natural substances (Moses, 2014). Describe the three drug preparations that you are likely to prescribe when managing your patients; give one example for each. (6 Marks)
b) Nurses are advised to use generic names over any other names. Explain why generic names are preferred over other drug names. (6 Marks)
c) Discuss the processes involved in drugs metabolism. (13 Marks)

(25 Marks)

QUESTION 5

Amoclan is a combination of amoxycillin and clavulanic acid. Amoxycillin is stable in the presence of acidic gastric secretions. Peak blood levels are achieved 1 to 2 hours after administration. There is linear dose response in peak serum levels. The pharmacokinetics of amoxycilline and clavulanic acid are closely allied and neither is adversely affected by the food in the stomach. Approximately 18% of the total plasma amoxycillin content is protein bound. Amoxycillin diffuses readily into most body tissues with the exception of brain and spinal fluid. Inflammation generally

increases the permeability of the meninges to penicillins and this may apply to amoxicillin. The elimination half-life of amoxicillin is approximately 1 hour. Co-administration of probenecid has little effect on the excretion of the clavulanic acid component of the formulation. Small amounts of amoxycillin are also excreted in the faeces.

Discuss the features that enable Amoclan to have these pharmacokinetics.

(25 Marks)