(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

SECOND YEAR, FIRST TRIMESTER EXAMINATION

FOR THE DEGREE IN BSC. CLINICAL MEDICINE AND BSC PHYSIOTHERAPY

COURSE CODE: HCM 255 /BSP 213

COURSE TITLE: GENERAL PHARMACOLOGY I

DATE: Tuesday 11th January 2022 **TIME:** 10:00AM-1:00PM

INSTRUCTIONS TO CANDIDATES

Answer All Questions

Section A: Multiple Choice Questions (MCQ)	20 Marks.
Section B: Short Answer Questions (SAQ)	40 Marks.
Section C: Long Answer Question (LAQ)	40 Marks

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 7 Printed Pages. Please Turn Over.

Section A : Multiple choice questions **20 marks**

1. Distribution of drugs to specific tissues;
   A. Is independent of blood flow to the organ
   B. Is independent of the solubility of the drug in that tissue
   C. Depends on the unbound drug concentration gradient between blood and tissue
   D. Is increased for drugs that are strongly bound to plasma proteins
   E. Has no effect on the half-life of the drug
2. Advantages of parenteral rout of administration does not include one of the following:
   A. Rapid onset of action
   B. Low risk of overdosing
   C. Precise dosing
   D. Absence of influence on gastrointestinal tract
   E. 100% bioavailability
3. Regarding termination of drug action;
   A) Drug must be exerted from the body to terminate their action
   B) Metabolism of drugs always increases their water solubility
   C) Metabolism of drugs always abolishes their pharmacologic activity
   D) Hepatic metabolism and renal excretion are the two most important mechanisms involved
4. The following are excreted faster in basic urine;
   A) Weak acids
   B) Strong acids
   C) Weak Bases
   D) None of the above
5. Which of the following drugs may inhibit the hepatic microsomal P450 responsible for warfarin metabolism;
   A) Cimetidine
   B) Ethanol
   C) Phenobarbital
   D) Procainamide
   E) Rifampin
6. Concerning the volume of distribution of a drug (Vd), all the statements are correct EXCEPT?
   A) An edema causes an increase in the volume of distribution (Vd)
   B) The volume of distribution (Vd) for a drug that is highly bound in peripheral tissues would be high.
   C) An edema always causes an decrease in volume of distribution (Vd)
   D) A drug with a small volume of distribution (Vd) means most of the drug is retained in the plasma and does not get distributed into tissue.
   E) Azithromycin a drug distributed in tissue more than plasma has a large volume of distribution and is likely to have a long duration of action due to less hepatic metabolism.
7. What is the fraction of unchanged drug reaching the systemic circulation?
   A) Elimination
   B) Bioavailability
   C) Metabolism

D) Drug displacement
E) Volume of distribution (Vd)

8. Distribution is the
   A. Process that defines the drug entrance into the systemic circulation from the site of administration or application
   B. Abstract concept, which determines where is a drug distributed
   C. Chemical processing of drugs before they will leave an organism
   D. Disposition of a drug throughout the body from the general circulation
   E. Elimination of drugs from the body
9. While beta-lactam antibiotics remain one of the most commonly prescribed types of antibiotics, they have side effects that can range from mild to life-threatening in nature. What type of side effect is most commonly observed?
   A. Allergic reactions
   B. Yellowing of teeth
   C. Bone marrow suppression
   D. Nephrotoxicity
   E. Hearing loss
10. Which of the following antibiotics mode of action is inhibition of folate synthesis by inhibiting the enzyme Dihydrofolate reductase (DHFR).
   A. Sulfadoxine
   B. Erythromycin
   C. Amphotericin B
   D. Amoxicillin clavulanic acid
   E. Trimethoprim
11. What antifungals are used to treat Cryptococcal meningitis?
   A) Flucytosine, terbinafine and amphotericin B
   B) Amp B and 5-fluorocytosine only
   C) Flucytosine, Amphotericin B and fluconazole
   D) Miconazole only.
12. Following administration, blood brain barrier prevents effective treatment of CNS tuberculosis:
   A) Rifampicin
   B) Ethambutol
   C) Isoniazid (INH)
   D) Kanamycin
   E) Pyrazinamide
13. Liver toxicity (hepatotoxicity) in management of TB can be attributed to
   A) Isoniazid (INH)
   B) Rifampin
   C) Pyrazinamide
   D) All of the above
14. Which of the following is an advantage of sublingual administration?
   A) Rapid absorption
   B) Convenient
   C) Avoid harsh GI environment
   D) Avoid first pass-metabolism

D) Drug displacement
E) Volume of distribution (Vd)

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E) All off the above

15. Mechanism of drug action is explored by:
    A. Pharmacokinetics
    B. Pharmacogenetics
    C. Pharmacoeconomics
    D. Pharmacodynamics
    E. Pharmacognosy
16. Find correct definition to presystemic metabolism (first pass metabolism).
    A) drug inactivation in the systemic circulation
    B) drug inactivation in kidneys
    C) drug inactivation in the liver after systemic circulation
    D) enzymatic cleavage in the gastrointestinal lumen, gut wall, by bacterial enzymes, and in the liver
    E) enzymatic cleavage in the gastrointestinal lumen
17. Bioavailability of drug refers to:
    A. Percentage of administered dose that reaches systemic circulation in the unchanged form
    B. Ratio of oral to parenteral dose
    C. Ratio of orally administered drug to that excreted in the faeces
    D. Ratio of drug excreted unchanged in urine to that excreted as metabolites
18. Susan H arrives at the emergency department with complaints of high fever, malaise, painful urination and severe flank pain. Lab tests indicate the presence of white blood cells and *E.coli* in her urine. A diagnosis of kidney infection (pyelonephritis) is made, and the decision is made to use a beta-lactam antibiotic that has both an appropriate antibacterial spectrum of activity, and good tissue penetration, yet is more resistant to beta-lactamases than narrow spectrum penicillins. The drug that best fits these characteristics is:
    A) Ceftriaxone
    B) Daptomycin
    C) Phenoxymethyl penicillin
    D) Procaine penicillin
    E) Vancomycin
19. Which of the following agents can generally be classified as broad spectrum antibiotics;
    (a) Tetracycline
    (b) Benzyl penicillin
    (c) Chloramphenicol
    (d) dihydrostreptomycin
    (e) Isoniazid
        A) (a) and (b) only
        B) (c) and (d) only
        C) (a) and (c) only
        D) None of the above
        E) All of the above
20. Select the single best answer from the following statements about antifungal drugs.
    A) Nystatin is only used for treatment of dermatophytes fungal infections.

B) Treatment for two weeks with griseofulvin will completely cure dermatophytes infections of toe nails.
C) Terbinafine does not accumulate in keratinized tissue.
D) Amphotericin B has good oral bioavailability and crosses the blood brain barrier, it can therefore be used to treat Cryptococcal meningitis.
E) Fluconazole has good oral bioavailability, is well distributed in all tissues and is used to treat febrile neutropenia that does not respond to antibiotics in patients.

Section B : Short Answer Questions **40 marks**

1) List five disadvantages of intravenous administration of a drug.(5marks)
2) Explain what is meant by enterohepatic circulation of a drug and elaborate the significance of gut flora in this process. (5marks)
3) Explain what you understand by the term first pass metabolism. (5 marks)
4) Using suitable diagrams, compare the plasma concentration of a drug over time after it is given to the same patient via the oral, intravenous, subcutaneous and intramuscular routes of drug administration. (5marks)
5) List any five examples of topical antifungal agents and five examples of antibacterial agents that can be applied topically.(5marks)
6) Provide the appropriate response in each of the following cases; (5marks)
   a) What is the relationship between Lopinavir and ritonovir
   b) An antibiotic that cannot be used in children under seven years and pregnant women as it causes yellowing of teeth:
   c) The antibiotic indicated for the treatment of Methicillin resistant Streptococcus aureus (MRSA) infection.
   d) An example of an antibiotic with activity against Pseudomonas aeruginosa:
   e) An example of a polypeptide antibiotic:

Explain the rationale of combining:
a) Benzyl penicillin and gentamycin (3 marks)
b) Amoxicillin and clavulanic acid (2 marks)

8. List any antibiotics that are used to treat tuberculosis in Kenya that can be taken orally. (5marks)

SECTION C (ESSAY QUESTIONS) **(40 marks)**

1. (a) Amphotericin B is a commonly used antifungal agent in the management of cryptococcal meningitis. It is poorly absorbed orally and is given intravenously to these patients. During infusion the patient may develop a myriad of adverse. Give examples of infusion related adverse effects of amphotericin B and the measures taken to minimize them. (10 marks)

(b) Treatment of tuberculosis involves combining several antibacterial agents to effectively eradicate the mycobacterium from the lungs, these agents are also associated with many adverse effects in the patients. State and explain the adverse effects associated with anti TB medication and in each case state at least one agent specifically associated with the adverse effect (10 marks)

2. (a) Aminoglycosides are an important class of antibiotics, discus aminoglycosides under the following topics;

- Oral bioavailability (2 marks)
- Mechanism of action (2 marks)
- Adverse reactions (3 marks)
- Indications (3 marks)

(b) State any five shortcomings of penicillins and for each state how it was overcome in clinical practice. (10marks)