KISII UNIVERSITY
UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF THE DIPLOMA IN CLINICAL MEDICINE AND SURGERY
THIRD SEMESTER 2022/2023
[MAY-AUGUST, 2023]

CIMS 0287: CLINICAL PHARMACOLOGY III

STREAM: Y2S3 **TIME: 2 HOURS**

DAY: THURSDAY, 2:00 – 5:00 PM **DATE: 27/07/2023**

INSTRUCTIONS

1. Do not write anything on this question paper.

PART I SECTION A: SHORT ANSWER QUESTIONS (60 MARKS)

EACH QUESTION CARRIES 10 MARKS

1)

a) List four adverse effects of alkylating agents. (2mks)

b) State the mechanism of action of the immunomodulatory (IMiD) agents. (4mks)

c) How do the vinca alkaloids work? (4mks)

2)

a) List FOUR subclasses of the cell cycle-specific antineoplastic agents. (2mks)

b) What is the importance of drug holidays in cancer chemotherapy? (4mks)

c) State the mechanism of action of aromatase inhibitors. (4mks)

3) Classify and state the FDA approved indication(s) of the following antineoplastic agents.

a) Abiraterone (2mks)

b) Tamoxifen (2mks)

c) Anastrozole (2mks)

d) Trastuzumab (2mks)

e) Bevacizumab (2mks)

4)

a) Describe briefly the mechanism of action of any two subclasses of antimetabolites used for treatment of cancer. (6mks)

b) Name two antineoplastic agents belonging to each of the two antimetabolite subclasses you identified in Q4(a) above. (4mks)

5)

a) a) State the goals of drug therapy of erectile dysfunction. (4mks)

b) Classify and state the mechanism of action of sildenafil. (6mks)

a) Name and classify any two drugs from different subclasses of drugs used to enhance uterine muscle contractility. (4mks)

b) State the mechanism of action of each of the drugs you named in Q6(a) above. (6mks)

PART I SECTION C: LONG ESSAY QUESTIONS (40 MARKS)

EACH QUESTION CARRIES 20 MARKS

ANSWER <u>ANY TWO</u> QUESTIONS IN THE ANSWERBOOKLET PROVIDED

1)

a) Explain briefly how the selectivity of antineoplastic agents impacts their therapeutic utility and adverse effects. (8mks)

b) Discuss the principles of combination chemotherapy as they apply to anticancer agents. (12mks)

a) Using a sketch diagram of the nephron and tubules, identify the sites of action of each of the following classes of diuretics: -

i) Loop diuretics. (2mks)

ii) Thiazide diuretics. (2mks)

b) For each of the classes of diuretics listed in Q2 (a) above, explain the mechanism of action. (8mks)

c) Discuss how alkalization and acidification of urine can be applied to increase urinary excretion of overdosed and absorbed acidic and basic drugs. (8mks)

3)

a) What are the goals of treatment of benign prostatic hyperplasia (BPH)? (4mks)

b) Outline the pharmacologic management of BPH. (4mks)

c) Discuss the mechanisms of action and adverse effects of the following classes of drugs used to manage overactive bladders.

i. Alpha adrenergic Antagonists. (6mks)

ii. 5-Alpha reductase inhibitors. (6mks)

4)

a) What is a monoclonal antibody? (2mks)

b) How are monoclonal antibodies named? (4mks)

c) Name FOUR anticancer agents in the monoclonal antibody class? (4mks)

d) State two FDA-approved indications and molecular target of each of the following monoclonal antibody agents for treatment of cancer?

i. Alemtuzumab (Campath®) (3mks)

ii. Bevacizumab (Avastin®) (3mks)

e) How do monoclonal antibodies induce cytotoxicity in target neoplastic cells? (4mks)

5)

a) Name TWO agents in the Mammalian Target of Rapamycin (mTOR) inhibitor class? (2mks)

b) What malignancy is each of the Mammalian Target of Rapamycin (mTOR) inhibitors you named in Q5 (a) FDA approved for? (2mks)

c) What are the common dose ranges for each of the Mammalian Target of Rapamycin (mTOR) inhibitors you named in Q5(a) above? (4mks)

d) Briefly describe the mechanism of action of the Mammalian Target of Rapamycin (mTOR) inhibitors. (6mks)

e) State the major adverse effects of the Mammalian Target of Rapamycin (mTOR) inhibitors? (4mks)

PART II SECTION A: MULTIPLE CHOICE QUESTIONS (15 MARKS)

EACH QUESTION CARRIES ONE (1) MARK

ANSWER ALL QUESTIONS IN THE ANSWERSHEET PROVIDED

1) The antineoplastic chemotherapeutic agent that is classified as an alkylating agent is..
   A. Thioguanine
   B. Busulfan
   C. Bleomycin
   D. Vincristine
2) Binding to the enzyme dihydrofolate reductase is the mechanism of action for…..
   A. Procarbazine
   B. Paclitaxel
   C. Methotrexate
   D. Ifosfamide
3) Which of the following is considered to be the effective mechanism of action of the vinca alkaloids?
   A. Inhibition of the function of microtubules.

B. Damage and prevention of repair of DNA.
C. Inhibition of DNA synthesis.
D. Inhibition of protein synthesis.

4) Orally active 5-alpha reductase inhibitor that is moderately effective in reducing prostate size in men with benign prostatic hyperplasia(BPH)
A. Flutamide
B. spironolactone (Aldactone)
C. finasteride
D. Cyproterone

5) Methenamine salts are used as urinary antiseptics. The reason why they lack systemic antibacterial action is that they are
A. Not absorbed into the systemic circulation following oral ingestion
B. Rapidly metabolized by liver drug– metabolizing enzymes
C. Converted to formaldehyde only at low urinary pH
D. Substrates for active tubular secretion

6) How do antimetabolites exert their cytotoxic effect?
A. Inhibiting DNA synthesis by sliding between DNA base pairs
B. Inhibiting RNA synthesis by sliding between RNA base pairs
C. Acting as false metabolites in the microtubules
D. Acting as false substitutions in the production of nucleic acids

7) Which of the following antineoplastic drugs is a mitotic inhibitor and causes metaphase arrest ?
A. Busulfan
B. Vincristine
C. Cytarabine
D. Procarbazine

8) Which of the following is an important effect of chronic therapy with loop diuretics?
A. Decreased urinary excretion of calcium.
B. Elevation of blood pressure.
C. Elevation of pulmonary vascular pressure.
D. Ototoxicity

9) Which of the following is a cell cycle-specific anticancer drug that acts mainly in the M phase of the cell cycle?
A. Bleomycin
B. Cisplatin
C. Etoposide
D. Paclitaxel

10) Which of the following is considered to be the effective mechanism of action of the vinca alkaloids?

A. Inhibition of the function of microtubules.
B. Damage and prevention of repair of DNA.
C. Inhibition of DNA synthesis.
D. Inhibition of protein synthesis.

11) The tumor that is least susceptible to cell-cycle-specific (CCS) anti-cancer agents is..

A. Acute lymphoblastic leukemia.
B. Acute granulocytic leukemia.
C. Burkitt's lymphoma.
D. Adenocarcinoma of the colon.

12) A 50-year-old female is treated with paclitaxel. Of the following, how is paclitaxel classified?

A. An alkylating agent
B. An antimetabolite
C. A plant alkaloid
D. An antibiotic

13) A 41-year-old female is treated for endometrial cancer with tamoxifen. Of the following, how is tamoxifen classified?

A. An alkylating agent
B. An antimetabolite
C. A plant alkaloid
D. A hormonal agent

14) A 35-year-old female is being treated for cervical cancer with cisplatin. Of the following, how is cisplatin classified?

A. An alkylating agent
B. An antimetabolite
C. A plant alkaloid

15) The phase of the cell cycle that is resistant to most chemotherapeutic agents and requires increased dosage to obtain a response is the ……

A. M phase
B. G_2 phase
C. S phase
D. G_0 phase

PART II SECTION B: TRUE(T) AND FALSE (F) MULTIPLE QUESTIONS (75 MARKS)

EACH OPTION CARRIES 1 MARK

ANSWER ALL QUESTIONS IN THE ANSWERSHEET PROVIDED

1) Indications of tocolytics:
    A. Foetal death
    B. Anti-partum hemorrhage
    C. Rapture of membranes
    D. Preterm labour
    E. Threatened abortion
2) Tocolytic agents:
    A. Magenesium Sulphate
    B. Salbutamol
    C. Oxytocin
    D. Ergometrine
    E. Sodium Bicarbonate
3) Mechanism of action of ergometrine:
    A. Increases IC Ca^{2+} concentration
    B. Increases force and frequency of uterine contractions
    C. Decreases electrical activity of myometrial cell membrane
    D. Decreases synthesis and release of prostaglandins by the endometrium
    E. Decreases contractility at the fundus and body of uterus
4) Actions of oxytocin:
    A. Breast: Relaxes of myoepethelium of mammary alveoli
    B. CVS: Reduced blood pressure, reflux tachycardia
    C. Kidney: High doses cause ADH effects
    D. CNS: Neurotransmitter effect
    E. Sensitizes uterus to oestrogen
5) Indications of ergometrine:
    A. Prevention and treatment of PPH
    B. Quicken expulsion of uterine contents in complete abortion
    C. Hypertension
    D. Vascular disease
    E. Migraine headache
6) Contraindications of dinoprost (PGF_2):
    A. Induction of labour
    B. Therapeutic abortion after IUFD

C. Treatment of incomplete abortion
D. Asthma
E. Malpresentation

7) Classification of tocolytics:
   A. Adrenergic agonists
   B. Adrenergic antagonists
   C. Calcium channel blockers
   D. Prostagandin synthesis inhibitors
   E. Magnesium sulphate
8) Drugs used to treat erectile dysfunction (ED):
   A. Tadalafil
   B. Apormorphine
   C. Heparin
   D. Diclofenac
   E. Oxytocin
9) Lower urinary tract infections include
   A. Prostatitis
   B. Acute pyelonephritis
   C. Urethritis
   D. Cystitis
   E. Chronic nephritis
10) Treatment of cystitis:
   A. Duration: stat dose or 1 week
   B. Drugs: ciprofloxacin, cotrimoxazole
   C. Nitrofurantoin
   D. Gentamycin
   E. Metronidazole
11) Precaution for nitrofurantoin:
   A. Diabetes insipidus
   B. Diabetes mellitus
   C. Hepatitis
   D. Diarrhea
   E. Anemia
12) Hexamine hipppurate:
   A. Indications: metabolic acidosis, sever renal impairment
   B. Contraindications: Prophylaxis and long-term treatment of recurrent UTIs

C. Precautions: Pregnancy

D. Adult dose: 1g tid x $^{1}/_{52}$

E. Drug interactions: Potassium citrate

13) Drugs used to acidify urine:

A. Sodium bicarbonate

B. Ascorbic acid

C. Ammonium Chloride

D. Sodium tartrate

E. Potassium tartrate

14) Treatment of hyperkalaemia:

A. $^{1}/_{v}$ Sucrose to prevent hypoglycemia

B. $^{1}/_{v}$ Calcium gluconate

C. $^{1}/_{v}$ Sodium bicarbonate to correct acidosis

D. $^{1}/_{v}$ 201U Glucagon

E. $^{1}/_{v}$ 201U soluble insulin

15) Uterine stimulant:

A. Dinoprost (PGF_2)

B. Magnesium Sulphate

C. Ergometrine

D. Nifidipine

E. Oxytocin