



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

(LEVEL V)

PPB 520: PHARMACOLOGY VI

3RD TRIMESTER 2021/2022

TIME: 2 Hours

INSTRUCTIONS:

- The paper consists of **THREE** sections: **A, B and C.**
- Answer each section in a separate booklet. Label each booklet **CLEARLY.**
- Answer **ALL** questions.

SECTION A: DRUG ALLERGY AND ADVERSE DRUG REACTIONS

1. Which one of the following is a type IV hypersensitivity reaction?
 - A. Cotrimoxazole induced Stevens-Johnson syndrome.
 - B. Rituximab induced Serum sickness.
 - C. Minocycline induced vasculitis.
 - D. Quinidine induced lupus erythematosus.
 - E. Vancomycin flushing syndrome.
2. An example of type E adverse drug reaction is induced....
 - A. interstitial nephritis by paracetamol
 - B. Gray baby syndrome by chloramphenicol
 - C. angina pectoris by propranolol
 - D. hyperactivity by phenobarbital
 - E. haemolytic anaemia with methyl dopa
3. Risk of neural tube defects can be minimized by pregnant women receiving supplementation of ...
 - A. pyridoxine
 - B. folic acid
 - C. retinol

INVOLVEMENT IN ANY EXAMINATION IRREGULARITY SHALL LEAD TO DISCONTINUATION

- D. tocopherol
 - E. niacin
4. What days are the most vulnerable period in pregnancy when drugs can cause most malformations?
- A. 0-16
 - B. 17-60
 - C. 61-90
 - D. 91-120
 - E. 120-150
5. Which one of the following drugs **DOES NOT** require therapeutic drug monitoring?
- A. Digoxin
 - B. Phenytoin
 - C. Theophylline
 - D. Gentamycin
 - E. Paracetamol
6. Which one of the following **IS NOT** a common cause of type F adverse effects?
- A. Renal failure
 - B. Antibiotic resistance
 - C. Enzyme induction
 - D. Plasmapheresis
 - E. Drug interactions
7. The most likely cause of perforation of the nasal septum, hyperpigmentation, and white lines on the nails in a young female dental laboratory technician is ...
- A. acute mercury poisoning
 - B. chronic inorganic arsenic poisoning
 - C. chronic mercury poisoning
 - D. excessive use of supplementary iron tablets
 - E. lead poisoning
8. Chronic lead poisoning results in...
- A. peripheral motor neuropathy
 - B. encephalopathy
 - C. disruption of nail matrix

- D. normochromic, normocytic anaemia
E. desquamating rash to the palms
9. The spectrum of malformations due to thalidomide include the following **EXCEPT**...
- A. phocomelia
 - B. absent ears
 - C. imperforate anus
 - D. gut atresia
 - E. cataracts
10. A teratogenic effect due to angiotensin converting enzyme inhibitors (ACEIs) is:.....
- A. spina bifida
 - B. hypospadias
 - C. hydrocephalus
 - D. microcephaly
 - E. oligohydramnios
11. Giving five examples in each case, outline genes as a risk factor for serious adverse drug reactions. (5 marks)
12. Describe five effects of age on drug distribution. (5 marks)
13. With relevant examples in each case, describe three pharmacodynamic food drug interactions. (6 marks)
14. Mr. X, who is 65 years old, presents with fever, rash and jaundice among other symptoms, two weeks after surgery. This was the second surgery in two months. In both surgeries, halothane was the anaesthetic agent used. He is on clofibrate, low dose aspirin among other drugs. The diagnosis is that of acute hepatic injury.
- i. State the most probable type of drug hypersensitivity reaction and the culprit drug. (1 mark)
 - ii. Outline two factors that may have predisposed to this reaction. (2 marks)
 - iii. Describe the mechanism through which the drug in (i) above caused the acute hepatic injury. (3 marks)
15. Ms. Y is thirty years old and in the first trimester of pregnancy. She weighs 60kgs. She has been prescribed phenytoin 100mg/day. The dispensing pharmacist identifies this as a medication error and discusses it with the general practitioner for a change of prescription.
- i. State four malformations that can occur due to phenytoin use in pregnancy. (2 marks)

- ii. Describe the mechanism of teratogenicity of phenytoin. (4 marks)
- iii. State an alternative drug to phenytoin use in pregnancy and describe its mechanism of action. (2 marks)

SECTION B: CARDIOVASCULAR SYSTEM PHARMACOLOGY

1. Which one of the following statements is **FALSE**?
- A. Enalaprilat – angiotensin converting enzyme inhibitor.
 - B. Bisoprolol- Beta-one receptor antagonist
 - C. Minoxidil- blocks L-type calcium channels
 - D. Fenoldopam – Binds dopamine (D_1) receptors.
 - E. Tadalafil – Phosphodiesterase 5 inhibitor
2. The following are statement about pharmacological properties of cardiovascular drugs.
- I. Beta blocker blocks release of renin
 - II. Hydralazine inhibits L-type calcium channels
 - III. Site of action of dihydropyridines is sarcoplasmic reticulum
 - IV. Lacidipine and amlodipine have long duration of action
 - V. Metolazone blocks peripheral postganglionic adrenergic neurons
 - VI. The mode of action of digitoxin is $Na^+ - K^+ - ATPase$ activation

Which combinations of statement is **CORRECT**?

- A. I, II, VI
 - B. I, IV, VI
 - C. II, IV, V
 - D. I, III, VI
 - E. I, III, IV
3. Which of the following statement concerning centrally acting antihypertensives is **FALSE**?
- A. Include clonidine and methyl dopa.
 - B. Reduce sympathetic outflow.
 - C. Block alpha (α_{2A}) receptor
 - D. Useful in patient with with gastric ulcers
 - E. Sedation and xerostomia are prominent side effects.

4. The cardiovascular agent which has a very short duration of action and acts by releasing nitric oxide is
- A. guanabenz
 - B. aliskiren
 - C. mexiletine
 - D. hydralazine
 - E. nitroprusside
5. In a class, the lecturer made the following statements concerning angina pectoris.
- I. Classical angina occurs at rest and thus unpredictable
 - II. Continued administration of isosorbide dinitrate result in tolerance
 - III. Calcium channel blocker have no role in management
 - IV. Potassium channel openers include diazoxide and propafenone
 - V. pharmacotherapy include ranolazine and ivabradine
 - VI. Use of organic nitrate is associated with increased heart rate

Which combinations of statements is **FALSE**?

- A. I, II, VI
 - B. I, IV, VI
 - C. II, IV, V
 - D. I, III, VI
 - E. I, III, IV
6. Which one of the following is **NOT** a pharmacodynamic effect of a therapeutic dose of digitoxin in a failing heart?
- A. Decrease in end diastolic size
 - B. Increase in vagal tone
 - C. Shortening the systole while prolonging diastole
 - D. Increasing sensitivity of baroreceptor nerve endings
 - E. Increased in sympathetic activity
7. The following pharmacological properties are common among angiotensin convertingenzyme inhibitors and angiotensin receptor blockers **EXCEPT**...
- A. arterioles and venules vasodilation
 - B. decrease the force of contraction of the heart
 - C. decrease sympathetic outflow in CNS
 - D. increase prostaglandin (PGE₂) biosynthesis
 - E. inhibit Kinase II breakdown

8. Which one of the following statements is **FALSE** regarding management of stable angina?
- A. The main goal is coronary dilation
 - B. Labetalol decreases oxygen demand ✓
 - C. Nicardipine reduced nitro-glycerine requirements
 - D. Organic nitrate increases levels of cGMP ✓
 - E. Hydralazine acts via calcium calmodulin complex
9. Which one of the following is the **MAIN** pharmacodynamic property of lacidipine?
- A. Release nitric oxide
 - B. Decreasing total peripheral resistance
 - C. Decreases renin concentration in the blood
 - D. Decreasing oxygen demand in the heart
 - E. Increased potassium permeability in cell membranes
10. Which statement is **TRUE** regarding angiotensin converting enzymes inhibitors?
- A. Include lisinopril, losartan and aliskiren
 - B. Contraindicated in patient with renal disease
 - C. Adverse drug events include hyperglycaemia
 - D. Reduces the oxidation of low-density lipoprotein
 - E. Eliminated unchanged through the kidney
11. A drug that is used in severe hypertensive emergency, short-acting, acts via a Gprotein-coupled receptor, and must be given by intravenous infusion is...
- A. aliskiren
 - B. fenoldopam
 - C. hydralazine
 - D. metoprolol
 - E. nitroprusside
12. Which one of the following acts by inhibiting slow calcium channels in the SA and AV nodes?
- A. dronedarone
 - B. sotalol
 - C. Adenosine
 - D. Flecainide
 - E. Diltiazem

For question 13 – 15, match the pharmacological property with the corresponding drug in the table.

Drug	Pharmacological Property
13. Levosimendan	A. Hyperpolarization-activated cyclic nucleotide-gated (HCN) channel blockers
14. Ivabradine	B. Decrease transient outward delayed rectifier & inward rectifier K ⁺ currents
15. Amiodarone	C. Blocks L-type Ca ⁺⁺ channels in myocardial
	D. Activates acetylcholine-sensitive K ⁺ current in the atrium
	E. Potassium ion (K ⁺) channel opener ✓

16. Discuss amlodipine under the following subheadings: ^{سؤال ٦}

- Mechanism of action. (2 marks)
- Pharmacological effects. (4 marks)
- Pharmacokinetic properties. (4 marks)

17. Explain the pharmacological basis underlying the use of beta blockers as anti-arrhythmic drugs. (3 marks)

18. Regarding potassium channels openers:

- List four (4) drug examples. (2 marks)
- Describe the mechanism of action that result in decreased oxygen demand in the myocardium when used for angina. (3 marks)

19. Regarding heart failure;

- Name four (4) determinants of cardiac performance. (2 marks)
- Identifying the determinant of cardiac performance affected, outline the mechanism of action of the following drugs;
 - Inamrinone. (2½ marks)
 - Dobutamine. (2½ marks)

SECTION C: RESPIRATORY SYSTEM DISORDERS

1. Corticosteroids are classified as ...

- bronchodilators
- smooth muscle dilators
- anti-inflammatory agents
- lipid soluble agents
- bronchoconstrictors

2. Cromolyn sodium is indicated in all **BUT** which of the following conditions?
- A. Acute asthma
 - B. Asthma prophylaxis
 - C. Exercise-induced asthma
 - D. Allergic rhinitis
 - E. Chronic asthma
3. Which one of the following diseases is characterized by hypersecretion of mucus?
- A. Chronic bronchitis
 - B. Asthma
 - C. Cystic fibrosis
 - D. Emphysema
 - E. Alveolitis
4. Which of the following should be stressed when instructing a new patient in the use of aerosolized steroids?
- A. Use the MDI steroids only when symptoms are severe
 - B. Taper steroid use gradually under a physician's supervision
 - C. Adjust dosage and frequency according to how it "feels"
 - D. Alternate MDI steroids with other anti-asthmatic drugs
 - E. Use for one week and continue with the adrenergic agonists
5. What is the mode of action of acetylcysteine in promoting mucolysis?
- A. Disruption of plasma proteins
 - B. Increase of mucus alkalinity
 - C. Hygroscopic properties
 - D. Disruption of disulfide bonds
 - E. Decrease of mucus alkalinity
6. When administering corticosteroids by the aerosol route, a local side effect to monitor includes:
- A. appearance of nasal polyps
 - B. tachycardia
 - C. appearance of thrush
 - D. HPA suppression
 - E. Bradycardia

7. Which of the following is an indication for exogenous surfactant therapy?
- A. Prevention of sudden infant death syndrome in premature infants
 - B. Prevention of RDS in low birth weight infants
 - C. Rescue treatment for bronchopulmonary hyperplasia
 - ☒ D. Rescue treatment for asthma
 - E. Rescue treatment in COPD
8. Adrenergic bronchodilators mimic the actions of:
- A. acetylcholine
 - B. kinins
 - C. epinephrine
 - D. norepinephrine
 - E. histamine
9. Relaxation of smooth airway muscle in the presence of reversible airflow obstruction is a general indication for the use of:
- A. adrenergic bronchodilators
 - B. anti-infective agents
 - C. steroids
 - D. mucolytics
 - E. antileukotrienes
10. Roflumilast is a medication that belongs to a class of:
- ☒ A. Anticholinergics
 - B. Methylxanthines
 - C. Phosphodiesterase inhibitors
 - D. Long-acting beta agonist
 - E. Short-acting beta agonist
11. Disease states that could benefit from the use of adrenergic bronchodilators include the following:
- I. Asthma
 - II. Bronchitis
 - III. Emphysema
 - IV. Bronchiectasis
 - V. Pleural effusion

Which choice below is **CORRECT**?

- A. II, IV, and V
- B. I, II, III, and IV
- C. I, II, III, IV, and V
- D. I and III
- E. V

12. Your patient is diagnosed with persistent asthma. Which type of drug would you recommend to maintain bronchodilation and control bronchospasms?

- A. Long-acting adrenergic agent
- B. Alpha-adrenergic agent
- C. Mucolytic agent
- D. Short-acting adrenergic agent
- E. Monoclonal antibodies

13. Adrenaline is indicated for all of the following **EXCEPT**:

- A. systemic hypersensitivity reactions
- B. acute asthma episodes
- C. cardiac stimulation
- D. treatment of infections
- E. treatment of bronchospasms

14. Long-acting β_2 agonists are indicated for:

- A. mucus reduction
- B. treating infections
- C. maintenance therapy for asthmatics
- D. acute asthma attacks
- E. Chronic asthma attacks

15. Which one of the following pharmacologic agents antagonizes adenosine?

- A. Theophylline
- B. Glucocorticoids
- C. Cromolyn sodium
- D. Terbutaline
- E. Zileuton

16. Inhalation is the preferred route of administering catecholamines for the following reasons;

- I. rapid onset of action
- II. smaller dosage used
- III. reduced side effects
- IV. the drug is delivered to the target organ
- V. safe and painless route

Which choice below is **CORRECT**?

- A. III and IV only
- B. I, III, and V only
- C. I, II, III, IV, and V
- D. I and II only
- E. I

17. A direct-acting cholinergic agent used in bronchial challenge tests to assess the degree of airway activity is:

- A. edrophonium
- B. methacholine
- C. neostigmine
- D. phospholine
- E. acetylcholine

18. What is the main difference between salmeterol and formoterol? Formoterol...

- A. has slower onset and peak effect
- B. is more beta (β)₂ specific
- C. has a quicker onset and peak effect
- D. is a short-acting
- E. is less beta (β)₂ specific

19. The anticholinergic drugs used in respiratory disorders possess the following characteristic:

- A. do not cross lipid membranes easily
- B. are distributed quickly throughout the body when inhaled
- C. have no role in respiratory care
- D. are not as effective as inhaled agents
- E. are not used routinely because of their adverse effects

20. The anticholinergic drugs cause bronchodilation by:
- A. stimulating cholinergic sites
 - B. blocking adrenergic sites
 - C. stimulating adrenergic sites
 - D. blocking cholinergic sites
 - E. reducing inflammation of the airways
21. Monoclonal antibodies are increasingly emerging as targeted therapies in the management of severe asthma. Discuss these agents under the following headlines:
- i. List two drug examples (1 mark)
 - ii. Mechanism of action (3 marks)
 - iii. Limitations of use (1 mark)
 - iv. Three major adverse effects (3marks)
22. Giving two examples of beta (β)₂ adrenergic agonists, discuss their mechanism of action (5marks)
23. With regards to the use of methylxanthines discuss the following:
- i. List two examples of this class (1 mark)
 - ii. The pharmacokinetics of ONE of the methylxanthines (2 marks)
 - iii. The mechanism of action (2 marks)
 - iv. Two major adverse effects (2 marks)