



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019

**SUPPLEMENTARY/SPECIAL EXAMINATION FOR THE DEGREE OF BACHELOR OF
PHARMACY (BPharm Level III)
PPB 320: PHARMACOLOGY II**

DATE: Monday, 6th January 2020

TIME: 2.00 p.m. - 5.00 p.m.

INSTRUCTIONS:

1. This paper consists of three sections A, B, and C
2. Answer all questions on the booklets provided
3. Answer each section on a separate booklet

SECTION A: AUTONOMIC NERVOUS SYSTEM

1. An injection of atropine causes all the following effects EXCEPT:
 - A. An increase in the heart rate
 - B. Pupillo-dilatation
 - C. Difficult micturition
 - D. Constriction of the bronchi
 - E. Diminished intestinal motility
2. Which of the following is not true about acetylcholine?
 - A. Its synthesis is catalyzed by the choline acetyltransferase enzyme
 - B. Its muscarinic actions can be blocked by atropine
 - C. Its nicotinic actions can be due to large doses of nicotine
 - D. It is not secreted by any sympathetic postganglionic nerve fibres
 - E. It stimulates the adrenal medulla

3. The actions of atropine can be antagonized by:
- A. Norepinephrine
 - B. Curare
 - C. Nicotine in large dose
 - D. Eserine
 - E. Reserpine
4. All the following about acetylcholine are correct EXCEPT:
- A. It causes slowing of the heart rate
 - B. It is released by the parasympathetic nerve endings in the sweat glands
 - C. It is the neurotransmitter in the suprarenal medullae
 - D. It is not affected by the enzyme COMT
 - E. Its synthesis requires the enzyme choline acetylase
5. A drug which blocks beta adrenoceptors is likely to cause:
- A. Relaxation of sphincters in the alimentary tract
 - B. Dilatation of the bronchi
 - C. A decrease in the force of myocardial contraction
 - D. An increase in dilatation by the blood vessels of skeletal muscles
 - E. An increase in insulin production
6. A drug that blocks the alpha adrenergic receptors is likely to cause:
- A. A reduction in sweat production
 - B. A fall in the arterial B.P. due to slowing of the heart
 - C. Failure of mydriasis in emotions
 - D. Constriction of the bronchi
 - E. Absence of secretion of the penis
7. A drug which blocks the beta adrenergic receptors causes:
- A. Dilatation of the bronchial muscle
 - B. Relaxation of the sphincters in the alimentary canal
 - C. Inhibition of cardiac properties
 - D. Dilatation of the visceral blood vessels
 - E. Reduction of the blood glucose due to stimulation of insulin release

8. A drug which augments parasympathetic activity can be :
- A. Diisopropylfluorophosphate (DFP)
 - B. Isoproterenol
 - C. Pilocarpine
 - D. Prodtigmine
 - E. Muscarine
9. The sympathetic preganglionic neurons release _____ at their terminals, and the effect is always _____
- A. norepinephrine ; inhibitory
 - B. norepinephrine ; excitatory
 - C. acetylcholine ; excitatory
 - D. acetylcholine ; inhibitory
 - E. epinephrine; inhibitory
10. Inhibitors of acetylcholinesterase enzyme cause:
- A. Enhance the effects of parasympathetic stimulation
 - B. Inhibit the effect of parasympathetic stimulation
 - C. Inhibit acetylcholine release by cholinergic nerve terminals
 - D. Block the action of acetylcholine in autonomic ganglia
 - E. Enhance the reuptake of acetylcholine
11. Describe the simultaneous diagnosis of myasthenia gravis and muscle weakness due to other causes. (6 marks)
12. Explain the differences in pharmacological activity between atenolol and prazosin and hence their indications. (6 marks)
13. Analyze the varied role of neostigmine and physostigmine based on their chemical structures. (6 marks)
14. Discuss with rationale the pharmacological approach you would take in the management of the following poisoning cases; (12 marks)
- a) Insecticide
 - b) Black widow spider venom
 - c) Amitraz (Triatix®)

SECTION B: CENTRAKL NERVOUS SYSTEM I

1. Which statement concerning the barbiturates is TRUE?
 - A. Abstinence syndromes are not observed with barbiturate
 - B. Alkalinization of the urine accelerates the elimination of phenobarbital
 - C. Barbiturates may increase the half-lives of drugs metabolized by the liver
 - D. Compared with barbiturates, the benzodiazepines exhibit a steeper dose-response relationship
 - E. Respiratory depression caused by barbiturate overdosage can be reversed by flumazenil
2. Which of the following processes plays the major role in terminating the action of thiopental:
 - A. Biliary excretion
 - B. Renal excretion
 - C. Hepatic metabolism
 - D. Redistribution
 - E. Fecal excretion
3. Zolpidem differs from diazepam in that:
 - A. It is safer in overdose than diazepam
 - B. Its hypnotic action shows little fading on repeated use
 - C. It causes more marked alteration of the sleep cycle
 - D. It has more potent muscle relaxant action
 - E. It does not bind the benzodiazepine receptor
4. Which one of the following statements is CORRECT regarding the anxiolytic and hypnotic agents?
 - A. Phenobarbital shows analgesic properties.
 - B. Diazepam and phenobarbital induce the cytochrome P450 enzyme system.
 - C. Phenobarbital is useful in the treatment of acute intermittent porphyria.
 - D. Phenobarbital induces respiratory depression
 - E. Buspirone has actions similar to those of the benzodiazepines.

5. The mechanism of antiseizure activity of carbamazepine is
- A. Block of sodium ion channels
 - B. Block of calcium ion channels
 - C. Facilitation of GABA actions on chloride ion channels
 - D. Glutamate receptor antagonism
 - E. Inhibition of GABA transaminase
6. Risk of neural tube defect in the offspring can be minimised in pregnant women receiving antiepileptic drugs by supplemental therapy with:
- A. Folic acid
 - B. Vitamin A
 - C. Vitamin E
 - D. Pyridoxine
 - E. Vitamin D
7. Sleep promoting effect of ramelteon is mediated by receptor:
- A. GABA_A receptor
 - B. Opiate receptors
 - C. GABA_B receptor
 - D. Melatonin receptors
 - E. Dopamine receptors
8. Which one of the following is a potent intravenous anesthetic but a weak analgesic?
- A. Propofol.
 - B. Benzodiazepines.
 - C. Ketamine.
 - D. Fentanyl.
 - E. Isoflurane.
9. Which of the following is correct regarding malignant hyperthermia?
- A. It is triggered by dantrolene.
 - B. It is triggered by local anesthetics.
 - C. It is generally mild and clinically insignificant.
 - D. It has no familial component.
 - E. It involves increased skeletal muscle oxidative metabolism.

10. Two inhaled general anesthetics, A and B, have the following MAC values:

A. MAC = 2%

B. MAC = 100%

Based on this information alone, which of the following statements is true?

- A. Drug A has a longer duration of action than Drug B
- B. Drug A is more soluble in the blood than Drug B
- C. Drug B causes greater analgesia and skeletal muscle relaxation than Drug A
- D. The concentration of drug in inspired air that is needed to cause adequate surgical anesthesia is higher for Drug B than for Drug A
- E. The time to onset of adequate general anesthesia is 50 times longer for Drug B than for Drug A

11. Outline the FOUR dopaminergic pathways in the brain and their functions. (4 marks)

12. Explain the relationship among tissue pH, drug pKa, and the rate of onset of local anesthetic action.. (3 marks)

13. Regarding phenytoin:

- i. Outline the pharmacokinetics (4 marks)
- ii. Describe pharmacological advantage of fosphenytoin over phenytoin (2 marks)

14. A 31-year-old woman has been treated with fluoxetine for 5 months. She is diagnosed with migraine headache and receives sumatriptan. She is rushed to the emergency department with unstable vital signs, muscle rigidity, myoclonus, CNS irritability and altered consciousness, and shivering. Outline what caused the patient's symptoms. (3 marks)

15. Describe the metabolism and elimination properties of valproic acid. (4 marks)

16. General anaesthetics are drugs which produce reversible loss of all sensation and consciousness.

- i. Describe what is meant by the term blood:gas partition coefficient on inhalation anaesthetics (2 marks)
- ii. Explain how the blood:gas partition coefficient of an inhalation anesthetic influences its speed of onset of anesthesia and its recovery time. (2 marks)
- iii. List FOUR components of balanced anaesthesia and induced drugs to achieve the components. (2 marks)

17. A 7-year-old boy is brought to the neurologist by his mother. She states that the boy's teacher says there are times in class when he stares "into space" and smacks his lips. In the office the boy has one such episode while having an electroencephalogram, which demonstrates a 3-per-second spike and wave tracing. The boy's diagnosis is epilepsy.

- i. What type of epileptic seizures is the boy likely to have? (1 mark)
- ii. What is the drug of choice for treatment of the seizures? (1 mark)
- iii. Describe the mechanism of action of the drug (2 marks)

SECTION C: CENTRAL NERVOUS SYSTEM II

1. Reason that dopamine is not used to treat Parkinson's disease:
 - A. it is too expensive
 - B. it is cholinergic in nature
 - C. it does not cross the blood-brain barrier
 - D. it is not metabolized in the periphery
 - E. it has serious adverse effects
2. This agent appears effective as monotherapy in bipolar depression.
 - A. Aripiprazole
 - B. Olanzapine
 - C. Thiothixene
 - D. Quetiapine
 - E. Haloperidol
3. Ethanol is used in methanol poisoning because it:
 - A. Antagonises the actions of methanol
 - B. Stimulates the metabolism of methanol and reduces its blood level
 - C. Inhibits the metabolism of methanol and generation of toxic metabolite
 - D. Replenishes the folate stores depleted by methanol
 - E. Replenishes the enzymes responsible for methanol metabolism
4. Which of the following agents is approved for treatment of diabetic neuropathy?
 - A. Phenytoin
 - B. Carbamazepine
 - C. Acetazolamide
 - D. Valproic acid
 - E. Gabapentin

10. Which of the following medications acts on N-methyl-N-aspartate (NMDA) glutamate receptors?
- A. Galantamine
 - B. Rivastigmine
 - C. Memantine
 - D. Tacrine
 - E. Amantadine
11. Outline the pharmacologic rationale of combining levo-dopa and carbidopa. (3 marks)
12. Discuss TWO reasons for the limited role of MAO inhibitors in affective disorders. (4 marks)
13. Distinguish the pharmacodynamic properties of typical and atypical antipsychotics. Include one drug example in each drug class (3 marks)
14. Explain the neurochemical imbalance underlying the symptoms of Parkinson's disease. (3 marks)
15. State FOUR drugs that cause extrapyramidal symptoms. (2 marks)
16. A patient develops profound fever, skeletal muscle rigidity, and autonomic and systemic electrolyte imbalances as part of a severe adverse response to a psychoactive drug. The working diagnosis is neuroleptic malignant syndrome.
- i. What psychoactive drug was likely to have been administered to the patient? (1 mark)
 - ii. What drugs should be administered to restore normal skeletal muscle function. (1 mark)
17. Describe the mechanism of action of TWO drugs used in the management of Huntington's disease. (4 marks)
18. Regarding lithium:
- i. Describe its mechanism of action (2 mark)
 - ii. Identify the distinctive pharmacokinetic features of lithium (4 marks)
 - iii. List THREE effects and toxicities. (3 marks)