BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF OPTOMETRY

CANDIDATE NUMBER: | | | | | | | | | |

OPT 208 GENERAL AND OCULAR PHARMACOLOGY

TIME 3 HOURS

INSTRUCTIONS:

- **Answer all questions (350 marks)**
- **The paper has two (2) sections: Section A and Section B**
- **Section A has two parts (i) long answer and (ii) MCQ**
- **In section B has MCQ true (T) or false (F) questions**
- **Each response on the MCQs is worth one (1) mark**

SECTION A

(i) Answer the following questions on the answer sheets provided.

Fill in the missing drug in the table below. **[20]**

DRUG/CHEMICAL	**ANTAGONIST/ANTIDOTE**
Warfarin	
	Atropine
Adrenaline/Noradrenaline	
	Ranitidine
Paracetamol/Acetaminophen	
Benzodiazepines (e.g diazepam)	
	Ethanol
	Pralidoxine, Atropine
	Desferoxamine
Opiates (morphine)	

(i) Explain Bioavailability **[3]**

(ii) Explain Volume of distribution **[3]**

(iii) Explain Pharmacokinetics **[3]**

(iv) Explain Intrinsic activity **[1]**

Classify drugs used in the treatment of glaucoma **[10]**

(ii) There is one correct answer in each of the following. Circle the correct answer on the question paper.

1. What is the dissociation constant (pK) of a drug?
(a) The pH at which the drug is 50% ionised
(b) –log10 [H+]
(c) A variable whose value depends on the surrounding pH
(d) A measure of a drugs stability in an aqueous environment

2. Which is the principal organ for the excretion of drugs?
(a) Liver
(b) Intestine
(c) Pancreas
(d) Kidney

3. Which of the following is an example of a pro-drug?
(a) Adrenaline
(b) Dorzolamide
(c) Latanoprost
(d) Timolol Maleate

4. What is the barrier that limits entry of hydrophilic drugs into the retina?
(a) Retinal efflux transporters
(b) Tight junctions between RPE cells and retinal vascular endothelial cells
(c) Anterior vitreous face
(d) Internal limiting membrane

5. Which drug should be administered with extreme caution to asthma/COPD patients because of possible bronchospasm
(a) Zanamivir
(b) Acyclovir
(c) Cidofovir
(d) None of the above

6. A drug that blocks α-adrenoceptors is likely to cause:
(a) Constriction of the bronchi
(b) A reduction in sweat production
(c) Absence of secretion of the penis
(d) Failure of mydriasis in emotions
(e) A fall in the arterial blood pressure due to slowing of the heart.

7. All preganglionic autonomic neurons secrete:
(a) Epinephrine
(b) Dopamine
(c) Nicotine
(d) Muscarine
(e) Acetylcholine

8. Which of the following antihistamines is used as an antitussive?
(a) Cetirizine
(b) Promethazine
(c) Diphenhydramine
(d) Astemizole
(e) Loratidine

9. Mechanism of action of anti-epileptics include:
(a) Modification of ionic conductance
(b) Inhibition of excitatory transmission
(c) Enhancement of GABA-ergic transmission
(d) a and c
(e) All of the above.

10. Histamine release is associated with all of the following, EXCEPT:
(a) Erythema
(b) Bronchospasm
(c) Ventricular fibrillation
(d) Hypertension
(e) Respiratory distress

SECTION B

Each question has five responses. Each response may be true or false. Indicate T or F against the response, for TRUE or FALSE respectively. Each correct answer is worth 1 (one) mark.

1. FK 506:
(a) is derived from fungus
(b) selectively inhibits the function of B cell lymphocytes
(c) decreases antibody production to T-cell dependent antigens
(d) is 100 times more potent than cyclosporin A
(e) is used in preventing allograft rejection

2. The following are true about lignocaine:
(a) it has a local anaesthetic action lasting for about 6 hours
(b) is more active if injected into an inflamed area
(c) inhibits the rapid influx of sodium ions into excitable cells
(d) its action is prolonged by the concurrent use of adrenaline
(e) its onset of action is faster than that of Marcaine

3. The following anti-epileptic drugs can cause visual field defects:
(a) carbamazepine
(b) phenytoin
(c) sodium valproate
(d) vigabatrin
(e) topiramate

4. The side effects of pilocarpine include:
(a) dry eye
(b) increased sweating
(c) bronchiolar spasm
(d) increased salivation
(e) constipation

5. Pilocarpine is contraindicated in the following conditions:
(a) malignant glaucoma
(b) pseudoexfoliation glaucoma
(c) hypertensive uveitis
(d) aphakic glaucoma
(e) subacute angle closure glaucoma

6. The following are true about local anaesthetics:
(a) they are weak bases
(b) they are either aminoesters or aminoamides
(c) they act faster on myelinated fibres than non-myelinated nerve fibres
(d) they cause both sensory and motor paralysis
(e) the potency and duration are increased by increasing the lipophilia of the compounds

7. The following are true with regard to acetazolamide:
(a) 99% of carbonic anhydrase must be inhibited before there is an effect on the intraocular pressure
(b) it increases rate of subretinal fluid absorption between retina and retinal pigment epithelium
(c) it reduces the rate of aqueous production by up to 50%
(d) a solution of acetazolamide has an alkaline pH
(e) it is excreted unchanged by the kidneys

8. True statements about carbonic anhydrase inhibitors include:
(a) at least 50% of the carbonic anhydrase needs to be inhibited before the intraocular pressure shows a significant drop
(b) they inhibit carbonic anhydrase found in the non-pigmentary ciliary epithelium.
(c) shallowing of the anterior chamber is a feature
(d) transient hypermetropia is a feature
(e) it can cause thinning of the cornea if given topically

9. True statements about metronidazole include:
(a) it is bacteristatic
(b) it inhibits bacterial protein synthesis
(c) it is most effective against Gram positive bacteria
(d) it has a good penetration of the blood-brain barrier
(e) alcohol should be avoided while taking metronidazole

10. Chloramphenicol:
(a) inhibits cell wall synthesis
(b) is active against Haemophilus and Neisseria
(c) causes ototoxicity
(d) causes aplastic anaemia
(e) of the topical form should not be given to children under 10 years of age

11. Heparin:
(a) is found in the human mast cells
(b) is not active if given orally
(c) lowers the plasma triglyceride level
(d) binds to anti-thrombin III and increases its inactivation of thrombin
(e) is reversed by administration of vitamin K

12. Warfarin:
(a) has a higher molecular weight than heparin
(b) is metabolized chiefly by liver
(c) acts within 24 hours of administration
(d) interferes with the production of factor II, VII, IX and X
(e) its control is based on the prothrombin time

13. The following medications can cause conjunctival pigmentation:
(a) betaxolol
(b) dipivefrine
(c) azetazolamide
(d) pilocarpine
(e) brimonidine.

14. Medications that can give rise to pigmentary changes of the macula include:
(a) chloroquine
(b) desferroxamine
(c) tamoxifen
(d) amiodarone
(e) chlorpromazine

15. Cytochrome P450:
(a) is found in the endoplasmic reticulum of hepatocytes
(b) is involved in phase I metabolism
(c) is induced by phenytoin
(d) is inhibited by cimetidine
(e) induction of P450 reduces the effect of warfarin

16. The following are true about topical steroids:
(a) the incidence of steroid induced glaucoma increases with increased strength of the prednisolone used
(b) in the intact cornea, prednisolone acetate has a better corneal penetration than prednisolone phosphate
(c) in the intact cornea, dexamethasone has a better corneal penetration than prednisolone acetate
(d) fluoromethalone has a poorer corneal penetration than prednisolone
(e) the anti-inflammatory effect of prednisolone acetate is increased if the concentration of the solution is increased from 1 to 2 %

17. The effects of apraclonidine include:
(a) conjunctival blanching
(b) upper lid retraction
(c) dry mouth
(d) mydriasis
(e) sour taste

18. Ptosis occurs with the following topical medications:
(a) pilocarpine
(b) guanethidine
(c) thymoxamine
(d) carbachol
(e) dorzolamide

19. The following are non-selective beta blockers:
(a) betaxolol
(b) carteolol
(c) timolol
(d) levobunolol
(e) metipranolol

20. Papilloedema can be caused by :
(a) tetracycline
(b) vitamin A
(c) prednisolone
(d) isoniazid
(e) chloramphenicol

21. The effects of prostaglandins on the eye include:
(a) increased trabecular outflow of the aqueous
(b) disruption of the ocular blood barriers
(c) mydriasis
(d) vasoconstriction
(e) increased vascular permeability

22. The effects of histamines on the eye include:
(a) increasing mucous production
(b) decreasing prostaglandin synthesis
(c) provoking smooth muscle spasm
(d) dilating the conjunctival capillaries
(e) chemotactic effect on eosinophils

23. The following are chemicals found in local anaesthetics:
(a) ketones
(b) esters
(c) amides
(d) ethers
(e) nitrous oxide

24. Supersensitivity of receptors occurs in the following situation:
(a) Adie's pupil
(b) Horner's syndrome with lesion of the first order neuron
(c) Horner's syndrome with lesion of the third order neuron
(d) patients on topical guanethidine
(e) Argyll-Robertson's pupils

25. The following are alkylating agents:
(a) azathioprine
(b) methotrexate
(c) cyclosporine
(d) cyclophosphamide
(e) chlorambucil

26. The following are true about latanoprost:
(a) it can reduce the intraocular pressure by 38% with once-daily dosing
(b) twice-daily dosing is less effective than once-daily dosing in lowering the intraocular pressures
(c) it increases the thickness of the eyelashes
(d) it causes reactivation of ocular herpes simplex
(e) it increases the number of melanocytes in iris

27. The following muscarinic agonists are structurally related acetylcholine:
(a) pilocarpine
(b) carbachol
(c) methacholine
(d) arecoline
(e) aceclidine

28. The following chemicals can cause pain when applied directly to the nerve endings:
(a) histamine
(b) serotonin
(c) prostaglandins
(d) bradykinin
(e) potassium

29. The following are true about intracameral drug administration:
(a) intracameral injection of local anaesthetic can be used during cataract surgery
(b) use of lignocaine containing preservatives should be avoided
(c) intracameral acetylcholine causes miosis
(d) intracameral carbachol causes miosis
(e) intracameral antibiotic is the treatment of choice in post-operative infective endophthalmitis

30. Latanoprost:
(a) is a prodrug
(b) is hydrolysed by esterase within the cornea
(c) increases the number of melanocytes
(d) causes cystoid macular oedema
(e) causes reactivation of herpetic keratitis

31. The systemic side effects of pilocarpine include:
(a) constipation
(b) excessive sweating
(c) urinary urgency
(d) bronchial spasm
(e) dry mouth

32. Hypokalaemia occurs with the following drugs:
(a) foscarnet
(b) acyclovir
(c) amphotericin
(d) carbonic anhydrase inhibitors
(e) itraconazole

33. The following pupils can be constricted with 1% pilocarpine:
(a) Adie's pupil
(b) Horner's pupil
(c) Complete third nerve palsy
(d) Argyll-Robertson's pupil
(e) Marcus-Gunn pupil

34. Thymoxamine:
(a) can be used to reverse mydriasis caused by phenylephrine
(b) causes transient hyperaemia of the conjunctiva
(c) causes miosis in normal people and decreased intraocular pressure
(d) causes lid retraction in normal population
(e) can be used to differentiate angle-closure glaucoma from open-angle glaucoma