

BINDURA UNIVERSITY OF SCIENCE EDUCATION  
FACULTY OF SCIENCE AND ENGINEERING  
DEPARTMENT OF OPTOMETRY

JUN 2025

BACHELOR OF SCIENCE HONOURS DEGREE IN OPTOMETRY

CANDIDATE NUMBER:

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OPTC 409: DIAGNOSTIC AND OCULAR THERAPEUTICS II

DURATION: 3 HOURS

(100 MARKS)

**INSTRUCTIONS**

Attempt ALL questions. Answer Section A on the question and Section B in the booklet.

**SECTION A. Attempt ALL questions.**

1. Which of the following glucocorticoids is a short- to medium-acting drug?
  - A. Prednisolone
  - B. Dexamethasone
  - C. Triamcinolone
  - D. Betamethasone
  
2. Which of the following statements concerning the anti-inflammatory effect of glucocorticoids is TRUE?
  - A. Anti-inflammatory effect of glucocorticoids results from inhibition of cyclooxygenase
  - B. Anti-inflammatory effect of glucocorticoids results from inhibition of phospholipase A2 and reducing prostaglandin and leukotriene synthesis
  - C. Induction of cyclooxygenase II expression which results in reducing amount of an enzyme available to produce prostaglandins
  - D. Biosynthesis of cyclooxygenase II expression which results in reducing amount of an enzyme available to produce prostaglandins
  
3. Which of the following property combinations is peculiar to the majority of NSAIDs?
  - A. Antihistaminic, antipyretic, analgesic
  - B. Immuno-depressive, anti-inflammatory, analgesic
  - C. Antipyretic, analgesic, anti-inflammatory
  - D. Anti-inflammatory, immune-depressive, antihistaminic
  
4. Which of the following NSAIDs is a selective COX-2 inhibitor?
  - A. Piroxicam
  - B. Indomethacin
  - C. Celecoxib
  - D. promelocam

5. The following statements concerning aspirin are true, EXCEPT:
- A. In contrast to most other NSAIDs, aspirin irreversibly inhibits COX
  - B. Aspirin interferes with the chemical mediators of the kallikrein system
  - C. Aspirin inhibits phospholipase A2
  - D. Aspirin inhibits thromboxane A2 formation
6. The following are adverse effects of fluorescein angiography EXCEPT
- A. dyspnea
  - B. hypotension
  - C. vomiting
  - D. hypertension
7. Indocyanine green angiography is contraindicated in patients allergic to
- A. Fluoresceine
  - B. Iodine
  - C. trypan blue
  - D. gentian violet
8. Antihistamines should be avoided in infants as a means of promoting sleep because epidemiological research has shown this practice is linked to an increased incidence of:
- A. sudden infant death syndrome
  - B. pneumonia
  - C. type-1 diabetes
  - D. asthma
9. Early symptoms of aspirin poisoning are
- A. Lethargy
  - B. skin rash
  - C. throbbing headache
  - D. ringing in the ears and blurred vision
10. The concentration of benzalkonium chloride used as a preservative in eye drops is
- A. 1.0%
  - B. 0.5%
  - C. 0.25%
  - D. 0.1%
11. A 28-year-old woman on oral contraception was in your clinic to be treated for a profound infection. Which one of the following antibiotics will not be recommendable?
- A. Gentamycin
  - B. Ciprofloxacin
  - C. Azithromycin
  - D. Sulfamethoxazole

12. The following are examples of decongestants EXCEPT
- A. Nedocromil
  - B. Naphazoline
  - C. Tetrahydrozoline
  - D. Phenylephrine
13. The only anti-allergic agent with concomitant mast cell stabilizing effect is .....
- A. Levocabastine
  - B. Olopatadine
  - C. Pheniramine
  - D. Azelastine
14. In the mechanism of action of sulphonamides folate synthesis is inhibited. Which of the following enzyme is relevant to this process?
- A. Dihydropteroate synthetase
  - B. Dihydropteroate synthetax
  - C. Dihydroptroate synthetase
  - D. Hydropteroate synthetase
15. Antibiotics are said to be chemotherapeutic in their action. This implies?
- A. They are bacteriostatic
  - B. They chemically active
  - C. They are selective in activity
  - D. They target only cell wall synthesis
16. Sulphonamides can be useful in all the following conditions EXCEPT
- A. UTI's
  - B. Ear infection
  - C. Bronchitis
  - D. Myiasis
17. Penicillin kills susceptible bacteria by specifically inhibiting the .....that catalyzes the final step in cell wall biosynthesis, the cross-linking of peptidoglycan.
- A. Transpeptidase
  - B. Hydroxylamine
  - C. Carbamylation
  - D. Carboxypeptidase
18. Penicillin is a structural analog of the.....
- A. Stearothermophilus
  - B. acyl-D-alanyl-D-alanine terminus
  - C. [14C] diacetyl-L-lysyl-D-alanyl-D-lactate
  - D. D-alanine carboxypeptidase

19. It is not advisable to take Amoxicillin with oranges. Which one of the following best explains the rationale for this?
- A. It slows absorption
  - B. It allows for an ideal substrate
  - C. It deactivated the drug
  - D. It is a clinical protocol
20. Cephalosporin a derivative of the fungus?
- A. *Cephalosporium acremonium*
  - B. *Streptomyces spp.*
  - C. *Staphylococcus aureus*
  - D. *Cephalosporium Avensis*
21. Which one of the following statements is NOT true about the mechanism of action of tetracyclines' antibacterial activity?
- A. They are protein synthesis inhibitors
  - B. They inhibit the binding of aminoacyl-tRNA to the mRNA-ribosome complex
  - C. They bind to the 30S ribosomal subunit in the mRNA translation complex
  - D. They inhibit matrix metalloproteinases
22. Increased contraction of the ciliary muscle coupled of excessive lacrimation could be associated with .....
- A.  $\beta$  receptors
  - B.  $M_2$  receptors
  - C.  $M_3$  receptors
  - D.  $M_4$  receptors
23. Which one of the following statements is INCORRECT with regards to 3<sup>rd</sup> generation  $H_1$  receptor blockers?
- A. They cause the blockage  $H_1$ -histamine receptors
  - B. They cause degranulation of mast cells
  - C. They possess anti-inflammatory activity
  - D. They cause reduction histamine biosynthesis
24. The two main pathways of  $P_{450}$  system metabolism of histamine are.....
- A. Methylation and oxidative deamination
  - B. Reductive deamination and methylation
  - C. Acetylation and glucuronidation
  - D. Sulphonisation and deamination

25. Which one of the following histaminic receptors is primarily responsible for CNS activity?
- A. H<sub>1</sub>
  - B. H<sub>2</sub>
  - C. H<sub>3</sub>
  - D. H<sub>4</sub>
26. Which one of the following receptors is associated with the releases of nitric oxide and prostaglandins?
- A.  $\alpha_1$
  - B. H<sub>1</sub>
  - C. B<sub>1</sub>
  - D. M<sub>2</sub>
27. All the following are examples of mast cell stabilizing agents EXCEPT
- A. Albuterol
  - B. Nedocromil
  - C. Cromolyn sodium
  - D. Azelastine
28. Which of the following best describes the observed delay in loratadine elimination when co-administered with erythromycin?
- A. Tachyphylaxis
  - B. Sensitivity
  - C. Refractoriness
  - D. Protraction
29. In a typical condition of xerostomia which one of the following medications would you recommend?
- A. Methacholine
  - B. Pilocarpine
  - C. Bethanechol
  - D. Scopolamine
30. The possible complication of hypertensive crisis stimulated by drug -food interaction upon the ingestion of MAO inhibitors could be attributed to the presence of..... in the food.
- A. Amphetamine
  - B. Tyramine
  - C. Muscarine
  - D. Alkaloids

31. All the following are side effects of H<sub>1</sub> receptor antagonist EXCEPT
- A. Tremors
  - B. Insomnia
  - C. Vomiting
  - D. Bradycardia
  - E. Drug-drug interaction
  - F. Drug metabolism
32. The following statements are TRUE about Cetirizine EXCEPT
- A. It is excreted unmetabolized
  - B. It is excreted in the urine
  - C. It is excreted in the feces through the bile
  - D. It induces cytochrome P<sub>450</sub> liver enzymes
33. Which one of the following statements is NOT true about Tetracyclines?
- A. They are natural and synthetic in nature
  - B. They are bacteriostatic
  - C. It interrupts many essential functions of bacterial
  - D. It is cytotoxic
34. All the following interferes with the optimal absorption of Tetracyclines EXCEPT
- A. Dairy products
  - B. Antacids
  - C. Normal saline
  - D. Iron salts
35. Which one of the following cannot be considered as an advantage of the structural semblance of penicillins with cephalosporins?
- A. Provision of alternative in peculiar clinical context
  - B. Management of possible toxicities
  - C. Avoidance of resistance episodes
  - D. Penicillins are cheaper than Cephalosporins
36. The only oral third-generation Cephalosporin agent is .....
- A. Ceftriaxone
  - B. Cefixime
  - C. Ceftazidime
  - D. Cefepime
37. The most striking feature of 4<sup>th</sup> generation Cephalosporins is.....
- A. Broader spectrum of antibacterial activity against gram positive bacteria
  - B. Broader spectrum of antibacterial activity against gram negative bacteria
  - C. Broader spectrum of antibacterial activity against MSRA

- D. Broader spectrum of antibacterial activity against both gram positive and negative bacteria
38. Which one of the classes of antibiotics are used in the management of acne?
- A. Quinolones
  - B. Sulphonamides
  - C. Macrolides
  - D. Tetracyclines
39. Which class of antibiotics has no oral formulations?
- A. Aminoglycosides
  - B. Cephalosporins
  - C. Penicillins
  - D. Vancomycin
40. All the following are reasons why Demeclocycline is contraindicated in pregnancy EXCEPT
- A. Retardation of fetal skeletal development
  - B. increased risk for minor birth defects e.g. inguinal hernia
  - C. Discoloration of permanent teeth
  - D. Discoloration of tooth enamel
41. A 30- years old male patient who is HIV positive, his treatment involves a 3-drug antiviral regimen (zidovudine, Didanosine, &ritonavir) with ketoconazole for oral candidiasis. Preliminary diagnosis is made of acute pancreatitis, if this diagnosis is true, the drug most likely to be responsible is:
- A. Didanosine
  - B. Ketoconazole
  - C. Zidovudine
  - D. Ritonavir
42. A 27-year-old nursing mother is diagnosed as suffering from genital herpes. She has a history of this viral infection previously responded to a drug used topically, which of the following drugs is most likely to be prescribed at this time?
- A. Acyclovir
  - B. Amantadine
  - C. Foscarnet
  - D. Ritonavir
43. What was the first antifungal medication?
- A. Amphotericin B
  - B. Clotrimazole
  - C. Fluconazole
  - D. Nystatin

44. Amphotericin B and Nystatin are both examples of which class of antifungal?
- A. Allylamines
  - B. Anti-metabolites
  - C. Azoles
  - D. Polyenes
45. Which of the following is NOT true regarding ergosterol?
- A. It is a biological precursor to Vitamin D
  - B. It is derived from Squalene
  - C. It is found in most fungal and all animal cells
  - D. It is the target for most antifungal medications
46. Which of the following is NOT a Triazole?
- A. Clotrimazole
  - B. Fluconazole
  - C. Itraconazole
  - D. Voriconazole
47. The various lipid associated version of Amphotericin B...
- A. Can be taken orally instead of intravenously
  - B. Increase efficacy
  - C. Reduce cost
  - D. Reduce side effects
48. Allylamines...
- A. Create porous holes in fungal cell walls
  - B. Inhibit B-1,3-glucan synthase
  - C. Inhibit Lanosterol 14a demethylase
  - D. Inhibit squalene epoxidase
49. Which of the following is NOT true regarding Caspofungin?
- A. It belongs to the Echinocandin class of antifungals
  - B. It inhibits B-1,3-glucan synthase
  - C. It is effective against *Candida* and *Cryptococcus* spp.
  - D. It results in the construction of an abnormal cell wall
50. Which of the following is true regarding Griseofulvin
- A. It exclusively treats dermatophyte infections
  - B. It has a narrow therapeutic window requiring therapeutic drug monitoring
  - C. It is a type of Allylamine
  - D. It is administered parentally



51. Which medication would you administer to treat Pulmonary Aspergillosis in a patient with renal impairment?
- A. Amphotericin B
  - B. Clotrimazole
  - C. Fluconazole
  - D. Voriconazole
52. Terbinafine is an example of which class of antifungal?
- A. Allylamine
  - B. Anti-metabolite
  - C. Azole
  - D. Polyene
53. Which class of drugs increases the concentration of all drugs metabolized by Cy P-450 enzymes?
- A. Allylamines
  - B. Anti-metabolites
  - C. Azoles
  - D. Polyenes
54. All the following drugs are analogues of nucleosides except
- A. Acyclovir
  - B. Zidovudine
  - C. Saquinavir
  - D. Didanosine
55. Which one of the following is a viral DNA synthesis inhibitor?
- A. Interferon
  - B. Saquinavir
  - C. Amantadine
  - D. Acyclovir
56. A 78-year-old woman has been taking an anti-glaucoma eyedrop for the past 20 years. The pressures in both eyes measure 18mmHg. Examination reveals the presence of black deposits in the lower tarsal conjunctiva of both eyes. What medication is she likely to be on?
- A. Brimonidine
  - B. Pilocarpine
  - C. Dipivefrine
  - D. Latanoprost

57. A 54-year-old woman with a past history of ophthalmic shingle develops a right uveitis and raised intraocular pressure measuring 30mmHg. There is also mild corneal oedema. She is on tricyclic antidepressant for post-herpetic neuralgia. Which anti-glaucoma medication is preferable?
- A. Timolol
  - B. Oral acetazolamide
  - C. Dorzolamide
  - D. Pilocarpine
58. A 78-year-old asthmatic man has bilateral mild ptosis and early glaucoma with raised intraocular pressures of RE 25 and LE 28. He was given an anti-glaucoma treatment. On review four weeks later, the pressures in both eyes are controlled and the ptosis improves. Which anti-glaucoma medication might have been given in this patient?
- A. Brimonidine
  - B. Pilocarpine
  - C. Iopidine
  - D. Latanoprost
59. A 29-year-old woman has bilateral pigment dispersion syndrome and raised intraocular pressures measuring RE 39 and LE 38. She is a keen sport woman and trains regularly for long-distance running. Which anti-glaucoma medication is preferable?
- A. Brimonidine
  - B. Dorzolamide
  - C. Iopidine
  - D. Latanoprost
60. What sort of receptor is the nicotinic receptor?
- A. A G-protein coupled receptor
  - B. A kinase linked receptor
  - C. An intracellular receptor
  - D. An ion channel
61. Which of the following is a clinical use for a muscarinic agonist?
- A. Treatment of myasthenia gravis
  - B. 'Switching off' the gastrointestinal tract prior to surgery
  - C. 'Switching on' the urinary tract after surgery
  - D. Increasing heart muscle activity in certain heart defects
62. What sort of receptor is the muscarinic receptor?
- A. A G-protein coupled receptor
  - B. A kinase linked receptor
  - C. An intracellular receptor
  - D. An anti-kinase receptor

63. Which one of the following is an unwanted effect of Zidovudine?
- A. Hallucination, dizziness
  - B. Anemia, neutropenia, nausea, insomnia
  - C. Hypertension, vomiting, thrombocytopenia
  - D. Peripheral neuropathy, headache
64. The drug of choice for the treatment of herpes and cytomegalovirus infection is.....
- A. Saquinavir
  - B. Didanosine
  - C. Acyclovir
  - D. Interferon alpha
65. A 68-year-old man, with a two-year history of chronic renal insufficiency is hospitalized because of a prostatectomy performed 4 days before. He is wearing a urinary catheter and on a treatment of a combination of broad-spectrum antibiotics. Recently he tested positive for *Candida albicans*. As the intern optometrist, within a team of Clinicians on ward rounds which would be your best choice systemic antifungal drug?
- A. Amphotericin B
  - B. Fluconazole
  - C. Piperacillin
  - D. Metronidazole
66. A 33-year-old, HIV positive homosexual man living near Mississippi river, was admitted to the hospital with a 3-week history of cough, productive yellow sputum, progressive dyspnea of exertion and 14-pound weight loss. Pertinent lab results on admission were: CD4+ lymphocyte counts 320 cells/mm<sup>3</sup>, lactate dehydrogenase 5000 IU/L (normal < 600). A blood stain showed neutrophils containing small, unencapsulated and encapsulated microorganisms. Fundoscopy showed discrete retinal patches. Which of the following statements correctly pairs the most likely disease of the patient with the appropriate treatment?
- A. Progressive disseminate histoplasmosis - amphotericin B
  - B. Progressive disseminate coccidioidomycosis - fluconazole
  - C. Pulmonary blastomycosis - fluconazole
  - D. Meningeal cryptococcosis- amphotericin B
67. Which of the following local anesthetics is more likely to cause allergic reactions?
- A. Lidocaine
  - B. Bupivacaine
  - C. Procaine
  - D. Ropivacaine

68. Which of the following local anesthetics is called a universal anesthetic?
- A. Procaine
  - B. Ropivacaine
  - C. Lidocaine
  - D. Bupivacaine
69. Which of the following local anesthetics is only used for surface or topical anesthesia?
- A. Cocaine
  - B. Tetracaine
  - C. Procaine
  - D. Bupivacaine
70. Which of the following local anesthetics is a short-acting drug?
- A. Procaine
  - B. Tetracaine
  - C. Bupivacaine
  - D. Ropivacaine
71. The choice of a local anesthetic for specific procedures is usually based on.....
- A. The duration of action
  - B. Water solubility
  - C. Capability of rapid penetration through the skin or mucosa with limited tendency to diffuse away from the site of application
  - D. All of the above
72. The primary mechanism of action of local anesthetics is.....
- A. Activation of ligand-gated potassium channels
  - B. Blockade of voltage-gated sodium channels
  - C. Stimulation of voltage-gated N-type calcium channels
  - D. Blockade the GABA-gated chloride channels
73. Local anesthetics are.....
- A. Weak bases
  - B. Weak acids
  - C. Salts
  - D. Amphoteric acid
74. A good local anesthetic agent shouldn't cause:
- A. Local irritation and tissue damage
  - B. Systemic toxicity
  - C. Fast onset and long duration of action
  - D. Vasodilatation

75. Which one of the following does NOT act on reverse transcriptase?

- A. Abacavir
- B. Didanosine
- C. Ritonavir
- D. Stavudine

76. All the following are related to the mechanistic anti-glaucoma action of Cannabinoids EXCEPT

- A. Vasodilation of efferent vessels of anterior uvea.
- B. Modification of surface membrane glycoprotein residues in the ciliary epithelium.
- C. Increased facility of outflow.
- D. Decrease in aqueous outflow.

77. Which one of the following Cannabinoid receptors can be found in the ciliary bodies of humans?

- A. CB 1
- B. CB 2
- C. M1
- D. M3

78. Which one of the following is the most important side effect of cannabinoids seriously limits their use in the treatment of glaucoma?

- A. Tachycardia,
- B. Euphoria
- C. Hypotension
- D. Conjunctival hyperemia

79. All the following does not account for the worrying effect of cannabinoids EXCEPT

- A. Progressive atrophic optic neuropathy.
- B. Reduced perfusion of the optic nerve head
- C. Excessive perfusion of the optic nerve
- D. Interaction with glycoproteins

80. All the following are under study as a potential anti-glaucoma as a cellular cytoskeleton modulator EXCEPT

- A. Ethacrynic acid
- B. Latrunculin B
- C. Swinholide A
- D. Memantine

**SECTION B (20 MARKS) Attempt *all* questions in this section**

1. What is mechanistically peculiar about Brimonidine as antiglaucoma agent? {2 marks}
2. Prostaglandin analogue has as its side effect ptosis. How does this happen? {2 marks}
3. What is the vehicle for Timolol maleate? {2 marks}
4. What is the essence of electrolytes in artificial tear formulation? {2 marks}
5. List the classical composition of artificial tears. {3 marks}
6. Ocular irrigating solutions have no pharmacologic action, what then accounts for their use during ophthalmic surgery. {2 marks}
7. Why are local anesthetics given concomitantly with vasoconstrictors? {2 marks}
8. Why are amide anesthetics ideal for ocular surfaces? {2 marks}
9. How different are anesthetics from analgesics in terms of action? {2 marks}
10. Give two examples of ester anesthetics. {1 mark}

**END OF PAPER**