



## TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MEDICAL SCIENCES

**UNIVERSITY EXAMINATION FOR:**

DIPLOMA IN PHARMACEUTICAL TECHNOLOGY

APM 2316 : ORGANIC & INORGANIC PHARMACEUTICAL CHEMISTRY

END OF SEMESTER EXAMINATION

**SERIES:**AUGUST2019

**TIME:**2 HOURS

**DATE:**Pick DateAug2019

### Instructions to Candidates

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **THREE**Section(s). Attempt All questions in section A and B and any two questions in section C.

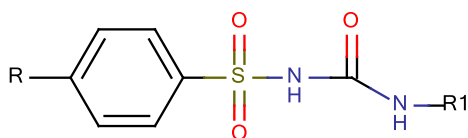
**Circle the correct answer in section A.**

## SECTION A (40 MARKS)

### Answer all the questions

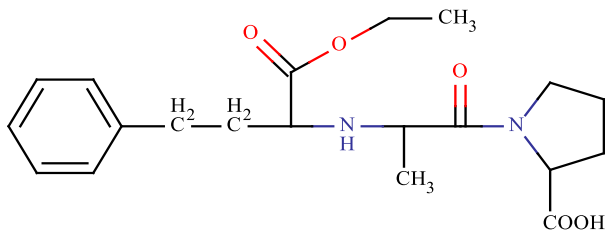
1. Select the incorrect statement regarding centrally acting anti-hypertensives:
  - A. Methyldopa is a prodrug
  - B. Clonidine causes vasoconstriction by stimulating  $\alpha_1$  receptors in the CNS
  - C. Clonidine has halogens that increases its activity
  - D. Methyldopa is safe in pregnancy
2. Which of the following diuretics DO NOT contain a sulphonamide group?
  - A. Amiloride
  - B. Indapamide
  - C. Acetazolamide
  - D. Hydrochlorothiazide
3. Which of the following statement is incorrect regarding the activity of the biguanides?
  - a) They act by stimulating the release of insulin from the beta cells
  - b) They increase glucose utilization in the muscles
  - c) They act by reducing gluconeogenesis
  - d) They cause the development of lactic acidosis

Figure below represents a class of drugs used in management of hyperglycaemia. Use it to answer the following two questions



4. Which of the statements below is correct concerning the SAR of the above class of compounds?
  - A. A methyl substituent para to the sulfonyl aromatic ring gives active compounds
  - A. A bulky group at R position abolishes activity
  - B. Bulky group at position R1 is not necessary for activity
  - C. Introduction of aromatic groups at R1 does not affect activity
5. Select the correct statement regarding the above class of compounds:
  - a) They are known as meglitinides

- b) Their main metabolic pathway is aromatic ring hydroxylation
  - c) They act by enhancing insulin secretion
  - d) Enhance the insulin utilization at the receptors
6. Which of the following statements is correct regarding angiotensin converting enzyme inhibitors with a phosphonate group in the structure?
- a) They are associated with skin rash and taste disturbances
  - b) They have good renal clearance properties
  - c) They have poor lipophilicity
  - d) They are also dicarboxylates
7. Select the correct alternative about angiotensin receptor blockers;
- a) They block the angiotensin I receptors
  - b) They are formulated as ester pro-drugs
  - c) They are formulated as acidic salts
  - d) They are formulated as basic salts
8. Select the correct statement regarding the cardiac glycosides:
- A. The non-sugar portion is known as the gennin
  - B. Common sugars linked to the nucleus include L-glucose and L-digitoxose
  - C. The aglycone portion carries the sugar and the steroid nucleus
  - D. They consist of a 5-membered lactone ring as part of the structure
9. Which of the following CVS agents is classified as a benzothiazepine derivative?
- a) Diazepam
  - b) Diltiazem
  - c) Disopyramide
  - d) Isradipine
10. Which of the following statement is true concerning the structure-activity relationship of the angiotensin converting enzymes inhibitors whose structure is shown below?



- a) They should always have a N-containing ring structure
- b) An aromatic ring is essential for activity
- c) Presence of a carboxylic group increases lipid solubility
- d) Those with a sulfhydryl group will have prolonged action

11. Which class of drugs may be used in emergency treatment of angina attack?

- a) Nifedipine
- b) Sotalol
- c) Isosorbide dinitrate
- d) Hydralazine

12. Which of the following statements is correct regarding drugs that affect thyroid function?

- a) Triiodothyronine and thyroxine are equipotent
- b) Levothyroxine enhances thyroid activity
- c) Carbimazole enhances the synthesis of thyroid hormones
- d) Propylthiouracil catalyses thyroxine synthesis

13. What is the correct mode of action of protamine sulphate?

- A. Blood anticoagulation
- B. Heparin inactivation
- C. Vitamin K antagonism
- D. Local haemostatic action

14. Which of the following is a component of the aglycone portion of the cardiac glycosides:

- (a) Steroid nucleus
- (b) Sugar group
- (c) Cyclic amide group
- (d) D- digitoxose group

15. Which of the following drugs is a  $\beta$  adrenoceptor agonist used in management of congestive heart failure?

- (a) Milrinone
- (b) Dobutamine
- (c) Digoxin
- (d) Carvedilol

16. Which of the following is an antiarrhythmic agent that acts by inhibition of sympathetic activity:

- (a) Propranolol
- (b) Verapamil
- (c) Prazosin
- (d) Lidocaine

17. Select the true statement concerning organic nitrates?

- (a) They are coronary vasoconstrictors
- (b) They are esters of organic alcohols and nitric acid
- (c) They should be stored at high temperatures to maintain their stability
- (d) They are used in chronic prophylaxis against angina attacks

18. Which of the following statements clearly explains why some angiotensin receptor blockers are formulated as ester pro drugs?

- (a) To eliminate skin and taste disturbances
- (b) To increase water solubility
- (c) To improve acid stability
- (d) To improve oral bioavailability

19. Which of the following diuretics is correctly matched with its pharmacological role?

- (a) Mannitol – hypertensive crisis
- (b) Frusemide – cardiac oedema
- (c) Bumetanide – acute mountain sickness
- (d) Spironolactone – Cerebral oedema

20. Spironolactone exerts its diuretic effect by:

- (a) Inhibiting potassium ion excretion
- (b) Inhibiting the action of the natural mineralocorticoid
- (c) Blocking sodium channels in the distal convoluted tubule
- (d) Blocking potassium channels in the distal convoluted tubule

21. Role of calcium carbonate, calcium phosphate, silicon oxide, aluminium oxide and granular polyvinyl chloride in a dentifrice is to:

- A. Reduce calculus deposition
- B. Clean the tooth mechanically

- C. Help in the removal of loose debris
  - D. All of the above
22. The optimum amount of fluoride in drinking water that does not produce mottling of enamel yet causing reduction in dental caries is:
- A. 0.01ppm
  - B. 0.1ppm
  - C. 1.0 ppm
  - D. 2.0 ppm
23. Dental fluorosis occurs in the permanent dentition only. It can be prevented by restricting children's intake of fluoride during the enamel calcification period:
- A. Both statements are true
  - B. Both statements are FALSE
  - C. The first statements is true, the second is false
  - D. the first statement is false, the second is true
24. Which one of the following compounds is a chain silicate?
- A. Bentonite
  - B. Kaolin
  - C. Attapulgate
  - D. Talc
25. The following are uses of talc except
- A. Used in dusting powders as protective's
  - B. Used in medicated dust in topical products
  - C. Used as filter aid
  - D. Used as a suspending agent
26. Layer silicate is made up of
- A. Talc and clay minerals
  - B. Attapulgate
  - C. Metasilisic acid
  - D. Silanol
27. The following compounds constitute Darrow's solution except
- A. Dextrose

- B.  $\text{MgCl}_2$
  - C.  $\text{NaCl}$
  - D.  $\text{KCl}$
28. In expression of concentration of fluids, osmolality refers to:
- A. The No. of moles per litre
  - B. The No. Of moles per kilogram
  - C. None of the above
  - D. a and b
29. Select the statement which is true concerning paracetamol:
- a) It is a Para amino phenol derivative
  - b) It is a weak base
  - c) It has strong anti-inflammatory activity
  - d) It has no toxicity
30. The gastrointestinal side effects of NSAIDs are associated with which group?
- a) Acid group
  - b) Aromatic nucleus
  - c) Side chain
  - d) Substituent on the side chain
31. Which of the following class of NSAIDS is of no benefit in inflammatory conditions?
- A. Salicylic acid derivatives
  - B. Anilines
  - C. Oxicams
  - D. Fenamates
32. The toxic metabolite of acetaminophen is usually removed through conjugation with?
- A. Benzoic acid
  - B. Glutamine
  - C. Glutamic acid
  - D. Glutathione
33. Boron / Borate is added to glass in order to:
- A. Hide blue-green color due to silica

- B. Modify thermal properties of glass
  - C. Increase refractive index of glass
  - D. Produce light resistant glass
34. Fluoride ion reduces the incidence of dental caries by;
- A. Increasing the formation of hydroxyapatite in the teeth
  - B. Increasing the solubility of hydroxyapatite
  - C. Acting as a protoplasmic poison
  - D. A and C
35. A 17-year-old teenager is admitted with severe dehydration accompanied by diarrhea. He is wasted and has no appetite. Clinical chemistry results tests reveal that he is acidotic. Which of the following electrolytic solutions would you recommend?
- A. a bolus of 50% dextrose
  - B. 0.9% NaCl and 5% dextrose
  - C. Darrow's solution
  - D. Ringer's lactate
36. The anion of choice in salt substitutes is
- A. Gluconate
  - B. Lactate
  - C. Iodate
  - D. Chloride
37. The solubility of inorganic compounds are largely determined by
- A. The cation present
  - B. The anion present
  - C. Presence of  $\text{Na}^+$  ions
  - D. The acid or basic nature of the compound
38. The following are properties of halogens are true except?
- A. Iodine is the most electronegative element
  - B. As atomic weight increases, the physical state changes from gas-liquid-solid
  - C. All halogens combine with hydrogen to form acids
  - D. oxidizing properties decrease with increase in atomic number
39. Ringers solutions has the following components



(i)Na<sup>+</sup> (ii) K<sup>+</sup> (iii) Cl<sup>-</sup> (iv) Ca<sup>2+</sup> (v) Acetate (vi) Lactate

A. i,ii,iii,iv,v,vi

B. i,ii,iii,iv,v

C. ii,iii,iv,v,vi

D. i,ii,iii,iv,vi

40. The goal of antacid therapy is

A. decrease concentration of acid in gastric juice

B. Gastric PH 3.5 and 7

C. Increase concentration of acid

D. Both A and B

### SECTION B (40 MARKS)

**Answer ALL questions from this section**

41. List classes of antihistamines giving an example in each class (4 marks)

42. Name any four drugs used in management of hypercholesterolemia (4 marks)

43. List four approaches in development of antihistamines (4 marks)

44. Explain why warfarin has a slow onset of action whereas heparin has immediate anticoagulant effect. (4 marks)

45. Explain the mode of action of zinc in treatment of diarrhea (4 marks)

46. List 3 causes of achlorhydria (3 marks)

47. Outline the medical uses of any three magnesium salts (3 marks)

48. Give main roles of the chloride ion in the body (4 marks)

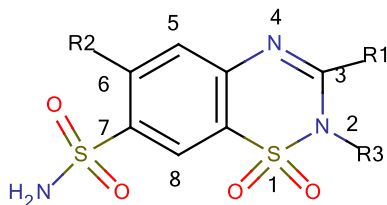
49. State types of chain silicates and Outline general uses of dimethylsiloxanes (4 marks)

50. List and Explain the role of trace elements (4 marks)

### SECTION C (40 MARKS)

**Answer ANY TWO questions from this section**

51. The structure below belongs to a group of drugs used as diuretics



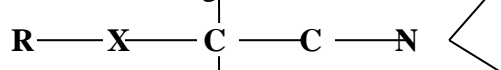
- (a) Discuss various classes of drugs used as diuretics (6 marks)
- (b) Discuss the SAR of the above class of diuretics (10 marks)
- (c) Illustrate its mechanism of metabolism in the body (4 marks)

52. (a) Discuss role of silicones and silicates in pharmacy, giving suitable examples (8 marks)

(b) List trace elements and discuss their role in human health (8 marks)

(c) List properties of an ideal product to be used as a protective (4marks)

53. Below is a general structure of an antihistamines use it to answer the questions below



- a) Discuss the mode of action of this group of compounds (3 marks)
- b) Discuss their SAR (10 marks)
- c) With examples, discuss various classes these compounds belong to. (7 marks)