



TECHNICAL UNIVERSITY OF MOMBASA

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. Dietary supplementation of calcium becomes necessary during the following EXCEPT
 - A. Pregnancy
 - B. Lactation
 - C. Period of rapid growth
 - D. Acromegaly
2. Ascorbic acid is normally administered with haematinics in order to:
 - A. Convert Fe^{2+} to Fe^{3+}
 - B. Convert Fe^{3+} to Fe^{2+}
 - C. Reduce pH of intestinal fluid
 - D. None of the above
3. Choose the incorrect statement in regard to non-systemic antacids
 - A. Their antacids effect is localized to the gastro-intestinal tract
 - B. The compounds used are generally soluble in the GIT fluid and plasma
 - C. Examples of cations used include aluminium magnesium and calcium bismuth
 - D. Anions used include carbonates, phosphates hydroxides or silicates
4. Which of the trace element is involved as a coenzyme in protein synthesis and is a central feature of Vit .B?
 - A. Molybdenum
 - B. Magnesium
 - C. Zinc
 - D. Cobalt
5. Fe^{3+} (ferric) employed in medicinal products is frequently encountered in the form of one of its soluble complex below EXCEPT
 - A. Ferric pyrophosphate
 - B. Ferric ammonium tartarate
 - C. Ferric ammonium citrate
 - D. Ferric iodide

6. 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
7. Choose the incorrect statement in regard to calcium gluconate solution:
- A. It is less irritating compared to calcium chloride
 - B. It is extensively used as a calcium supplement
 - C. It can be administered either via intramuscular or intravenous route
 - D. It is stabilized by protein lecithin as an injection
8. The following statements are FALSE in respect to calcium ion. Choose the correct one:
- A. About 99% of body calcium is normally found in the liver
 - B. Diffusible calcium in the body is plasma bound
 - C. Phosphate ion is normally an ion that interferes with calcium in the body inversely
 - D. Proper calcium absorption requires adequate levels of Vit. D.
9. Which of the following anions is not formulated for systemic use?
- A. Acetate
 - B. Bicarbonate
 - C. Carbonate
 - D. Citrate
10. Which of the following statements about $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ is correct
- A. Readily undergo hydrolysis
 - B. Is readily absorbed in the duodenum
 - C. Readily undergoes oxidation in acidic media
 - D. A and B are correct
11. Peroxides of Mg may be obtained from
- A. Precipitation of sea water
 - B. Treatment of $\text{Mg}(\text{OH})_2$ with hydrogen peroxide
 - C. Heating MgO at high temperature
 - D. Dehydrating $\text{Mg}(\text{OH})_2$

12. Which of the following is NOT used as internal protective?
- Aluminum hydroxide
 - Medicinal Zinc peroxide
 - Bismuth subnitrate
 - Magnesium trisilicate
13. In REDOX reaction, the oxidizing agent
- Is oxidized
 - Loses electrons
 - Is reduced
 - Increased in oxidation state
- 14 Which of the following statement is correct regarding the mode of action of metformin?
- It stimulates insulin release from the beta cells
 - It increases glucose utilization in the muscles
 - It enhances gluconeogenesis
 - It promotes secretion of insulin from beta cells

Figure 1 below represents a class of drugs used in management of hyperglycaemia. Use it to answer the following two questions

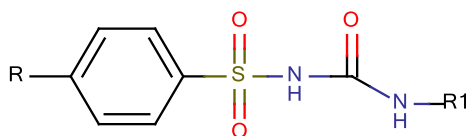


Figure 1

- 15 Which of the statements below is correct concerning the SAR of the above class of compounds?
- Introduction of aromatic groups at R1 does not affect activity
 - A methyl substituent para to the sulfonyl aromatic ring gives potent compounds
 - A bulky group at R position abolishes activity
 - Bulky group at position R1 is not necessary for activity
- 16 Select the correct statement regarding the above class of compounds:
- Their main metabolic pathway is aromatic ring hydroxylation
 - They act by enhancing insulin secretion
 - They are known as meglitinides

d) Enhance the insulin utilization at the receptors

17 Which of the following statements is correct regarding angiotensin converting enzyme inhibitors with a carboxylate group in the structure?

- a) They are associated with skin rash and taste disturbances
- b) They have good renal clearance properties
- c) They have high lipophilicity
- d) They are ultra-short acting

18 Select the correct alternative about angiotensin receptor blockers;

- a) They block the angiotensin I receptors
- b) They are formulated as acidic salts
- c) They are formulated as basic salts
- d) They are formulated as ester pro-drugs

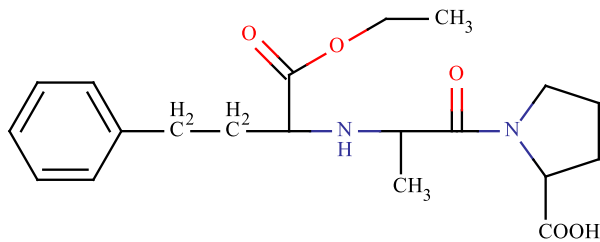
19 Select the correct statement regarding the structure of cardiac glycosides:

- a) Common sugars linked to the nucleus include L-glucose and L-digitoxose
- b) They consist of a 5-membered lactone ring as part of the structure
- c) The aglycone portion carries the sugar and the steroid nucleus
- d) The non-sugar portion is known as the gennin

20 Which of the following CVS agents is classified as a phenylalkylamine derivative?

- a) Verapamil
- b) Diltiazem
- c) Disopyramide
- d) Minoxidil

21 Which of the following statement is true concerning the structure-activity relationship of the angiotensin converting enzymes inhibitors whose structure is shown in figure 2?



- a) They should have an aromatic ring for activity
- b) Esterification decreases lipid solubility

- c) Presence of a carboxylic group increases side effects
 - d) Those with a sulfhydryl group have a short duration of action
- 22 Which of the following statement is true regarding spironolactone?
- a) It is an agonist of aldosterone
 - b) Its use can result in severe hyperkalemia
 - c) Has a very high diuretic effect
 - d) It blocks sodium channels in the distal convoluted tubule
- 23 Meclizine, an antihistamine has been derived from:
- a) Alkylamines
 - b) Propylamines
 - c) Ethylene diamines
 - d) Ethanolamines
- 24 Which of the following statement is incorrect about heparin?
- a) It is a mucopolysaccharide
 - b) It is a inhibitor of conversion of prothrombin to thrombin
 - c) It consists of sulphated glucosamine and glucuronic acid units
 - d) It has good oral bioavailability
- 25 Which of the following alternatives is correct regarding warfarin?
- a) It is a calcium sequestering agent
 - b) It is a coumarin derivative
 - c) It is suitable for emergency haemorrhage management
 - d) It is chemically classified as an indandione
- 26 The main application of haemostatic agents is:
- a) To arrest bleeding
 - b) Antiplatelet effect
 - c) Fibrinolysis
 - d) Blood storage
- 27 Short acting insulin is also known as:
- a) Soluble insulin
 - b) Ultralente insulin
 - c) Insulin lispro

- d) Insulin aspartic
28. Which of the following statements is true about precipitated chalk?
- a) it is more reactive than the prepared chalk
 - b) it is the form of chalk used for preparation of chalk mixtures
 - c) its antacid capacity is much less than that of aluminium hydroxide
 - d) it is less reactive than the prepared chalk
29. Glass materials are generally prepared by fusing pure silica with?
- a) sodium bicarbonate
 - b) calcium carbonate
 - c) sodium hydroxide
 - d) potassium chloride
30. The following statements regarding Bismuth compounds as gastric antacids are true except;
- a) small amount of dissolved bismuthyl cations also exerts mild antiseptic action
 - b) the compounds owe their antacid action mostly due to the cations
 - c) the compounds have no constipatory effects
 - d) none of the above
31. Citric acid 1.0 % is normally added to magnesium hydroxide prepared by hydration for Use in preparation of gastric antacid. The purpose of this acid is to?
- a) improve the attractiveness of the rather chalky appearance of the mixture
 - b) improve the effectiveness of the antacid
 - c) enhance the stability of the product during storage
 - d) choices B and D
32. Which of the following statements is not true of simethicone?
- a) It is a polymeric dimethylsiloxane
 - b) It can be used an antifatulant
 - c) It exhibits jellylike to solid like properties
 - d) It chemically consists of both carbon and silicon
33. Sodium chloride can be used in the following situations EXCEPT?
- A. As an enema
 - B. As a plasma expander
 - C. As a urinary alkalinizer

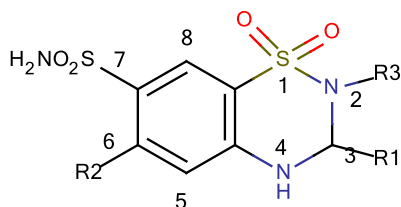
- D. In treatment of exposed tissues
34. Which of the following statements is true about Fluoridation?
- A. Involves formation of fluoride salts
 - B. Is a major cause of dental carries
 - C. Cannot be done domestically
 - D. Sodium fluorosilicate (Na_2SiF_6) is the compound of choice for large scale fluoridation of drinking water
35. Ringer's lactate is contra-indicated in the following conditions except?
- A. Lactic acidosis
 - B. Congestive heart failure
 - C. Mild metabolic acidosis
 - D. Renal impairment
36. Dextrose is used in replacement of water loss in the following conditions except?
- A. Fevers
 - B. Diarrhea
 - C. Diabetes Melitus
 - D. Malaria
37. The following are TRUE on calcium requirements except?
- A. Normal requirements range from 0.2- 1.0 g / day
 - B. Dietary requirement is lower in old age due to reduced metabolism
 - C. Dietary requirement is higher during pregnancy and lactation
 - D. The daily requirement is higher in childhood
38. Which of the following is false regarding Fluoride?
- A. Ion is toxic
 - B. Is found in bones and teeth
 - C. Is given as NaF
 - D. Optimum level in drinking water is 2ppm
39. The following statements on iodine are true except?
- A. Radioiodine is used for the treatment of hyperthyroidism
 - B. Tincture of iodine doesn't contain alcohol
 - C. Iodine deficiency can lead to mental retardation

- D. Iodine deficiency can cause enlargement of the thyroid gland
40. Which of the following statements on iodine supplements is not true?
- A. Lugol's solution contains both potassium iodide and iodine
- B. Iodide is converted to iodine in GIT
- C. Iodized salt is a source of iodine
- D. Ammonium iodide can be used as a supplement

SECTION B (40 MARKS)

Answer ALL questions from this section

41. Name 4 agents used as vasodilators in the control of hypertension (4 marks)
42. Outline general uses of dimethylsiloxanes (4marks)
43. List Four (4) groups of drugs used to treat arrhythmias giving a suitable example in each group 4 marks
44. State four SAR of the thiazide diuretics whose structure is as shown in Figure below 4 marks

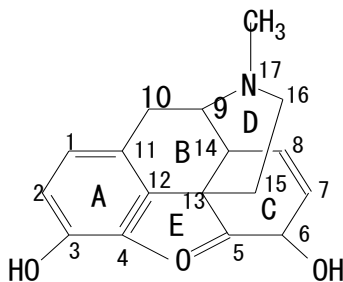


45. (a) Name 4 agents used as vasodilators in the control of hypertension 2 marks
- (b) List four non-sedating antihistamines 2 marks
46. Differentiate between proton pump inhibitors and histamine-2 receptor antagonists in terms of mode of action. 4 marks
47. What advantages do proton pump inhibitors have over histamine-2 receptor antagonists in therapeutics? 4 marks
48. Classify the anticoagulants agents and give suitable examples in each class 4 marks
49. Explain how stains on skin caused by silver compounds are removed. Use equation(s) where necessary. (4marks)
50. Define fluorosis and describe how it occurs (4 marks)

SECTION C (40 MARKS)

Answer ANY TWO questions from this section

51. Below is a structure for morphine. Use it to answer questions that follow.



- a) Explain its physicochemical properties **4 marks**
b) Explain the structural modification of morphine structure that results in morphinans.

Giving an example and use of morphinans **4 marks**

- (c) State eight SARs of morphine **8 marks**

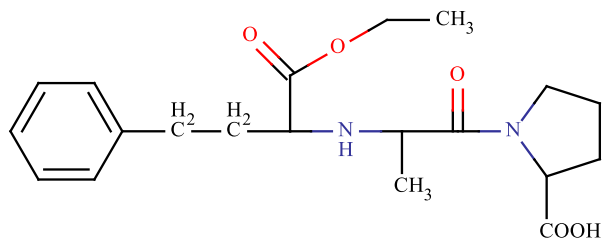
(d) Explain the structural modifications on the morphine structure below that would result in narcotic antagonists **4 marks**

52. (a) Explain with suitable examples types of glass of interest in pharmacy **(10 marks)**

(b) Discuss germicides in terms of **(10 marks)**

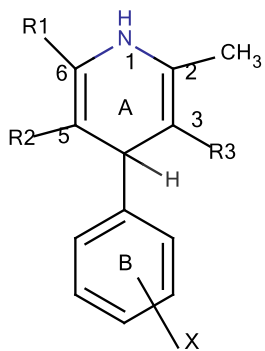
- Selection of a suitable germicide
- Different classes of germicides and their advantages and disadvantages

53. Below is a structure of angiotensin converting enzymes inhibitors?



- (a)
(i) Briefly discuss their mode of action **2 marks**
(ii) Discuss their structure activity relationship (SAR) **8 marks**

(b) The structure below belongs to a class of drugs used in the management of hypertension. Use the structure to respond to the questions that follow.



- (i) Give the general class and the specific chemical class to which these drugs belong **4 marks**
- (ii) Discuss the group SAR **6 marks**