



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES

BMLS12S -Regular

AMP 4110: CLINICAL CHEMISTRY I

SPECIAL/SUPPLEMENTARY EXAMINATION

OCTOBER 2013 SERIES

2 HOURS

Instructions to candidates:

This paper consist of **TWO** sections A and B

Section A –Contains MCQS, any wrong response will be penalised. Answer **ALL** questions in **Section B**.

SECTION A – MCQs – (30marks)

1. Which of the following is not involved in the maintenance of pH of the body fluids?
 - a) The operation of buffers in the blood
 - b) The control of respiratory ventilation
 - c) The active secretion of H^+ into filtrate by the kidney tubule cells
 - d) None of the above are correct
2. A blood pH of 7.6 would indicate:
 - a) Nothing it's normal
 - b) Acidosis
 - c) Alkalosis
 - d) Neutral
 - e) None of the above

3. Which of the following would occur from an increased capillary hydrostatic pressure ?
- Dehydration
 - Hypotonic hydration
 - Edema
 - Diabetes mellitus
 - Diabetes insipidus
4. What is the major anion in the ECF?
- Chloride
 - Sodium
 - Bicarbonate
 - Potassium
 - Zinc
5. Which of the following is NOT a major compartment for water?
- Intracellular
 - Cerebrospinal fluid
 - Intravascular
 - Interstitial fluid
6. Which is the chief cation in intracellular fluid?
- Na^+
 - Cl^-
 - K^+
 - Zn^{2+}
 - CO_3^{2-}
7. What is the hormone which controls sodium re-absorption from distal convoluted tubule?
- Aldosterone
 - ADH
 - Insulin
 - Glucagon
 - Testosterone
8. Match the following with the correct chemical formula:
- Weak base
 - Weak acid
 - Strong acid
 - Strong base

- a) NaHCO_3 = i
- b) H_2CO_3 = iv
- c) HCl = ii
- d) NaOH = i
- e) KOH = i

9. What is the name of low K^+ (Potassium) levels in the ECF?

- a) Hyperkalemia
- b) Hypokalemia
- c) Hypernatremia
- d) Hyponatremia
- e) Hyperremesis

10. The chlorides

- a) Are cations of the intracellular fluids
- b) Are anions of the extracellular fluid
- c) Are cations of the extracellular fluid
- d) Have a normal plasma range of 195 -205mmol/l
- e) Have a normal range of 205-255mmol/l

11. How does alcohol function as a diuretic?

- a) Alcohol dilutes the blood and thus enables increased urine out put
- b) Alcohol receptors in the liver sense its presence and trigger a biochemical pathway that increases urine output to rid the body of alcohol
- c) Alcohol inhibits the release of ADH and thus urine output is increased
- d) Alcohol increases the pulse rate which then increases the output of urine
- e) ACEs as a reducing agent

12. Metabolic acidosis is seen in

- a) An increase in rate and depth of breath
- b) A decrease in rate and depth of breath
- c) Excessive administration of sodium bicarbonate
- d) Administration of substances whose metabolism produces H^+
- e) Increased pulse rate

13. The normal range of sodium in blood is

- a) 135 -145mmol/l
- b) 3.8 – 5.0mmol/l
- c) 6.8 – 10.0mmol/l
- d) 5.0 – 6.8mmol/l
- e) 2.0 – 4.0mmol/l

14. The buffering power of blood is effected by:
- $\text{HCO}_3^-/\text{H}_2\text{CO}_3$
 - Na^+
 - K^+
 - Ca^{2+}
 - Zn^{2+}
15. A blood pH of 7.21 would indicate:
- Nothing it's normal
 - Acidosis
 - Alkadosis
 - Neutrality
 - Extreme alkalosis
16. Cerebrospinal, fluid within the eyes, joints and body cavities and fluid secretions of exocrine glands are all classified specifically as :
- Intracellular
 - Extracellular
 - Transcellular
 - Intravascular
 - Intradermal
17. How is it possible for the rate and depth of breathing to affect hydrogen ion concentrations in body fluids?
- During increased air exchange, more oxygen is exchanged with body cells, binding hydrogen ions
 - During increased air exchange, more carbon dioxide is given off returning hydrogen ion concentrations to normal.
 - During increased respiration over the long term, more haemoglobin is produced, thus increasing the buffering of blood.
 - The rate and depth of breathing does not alter hydrogen ion concentration in body fluids
18. Which body compartment contains the greatest relative amount of water?
- Extracellular
 - Intracellular
 - Plasma
 - Transcellular
 - Intradermal

19. Which of these conditions lead to a severe, life-threatening water loss?
- Diabetes mellitus, type 1
 - Diabetes mellitus, type 2
 - Diabetes insipidus
 - Hyponatremia
 - Hyperkalaemia
20. Regarding diabetes mellitus
- NIDDM commonly seen in person below 40 years
 - NIDDM tend to occur in obese person
 - Serum insulin level is absent in NIDDM
 - Serum glucose levels are decreased
 - None of the above
21. Insulin
- Is a protein synthesized by β cells of islets of Langerhans
 - Secretion is stimulated by hot weather
 - Increase gluconeogenesis in liver
 - Increase glycogenolysis in liver and muscle
 - Is an enzyme
22. Under normal circumstances _____ is the greatest source of hydrogen ions
- Carbon dioxide
 - Lactic acid
 - Oxidation of fatty acids
 - Hydrolysis reactions
 - Dehydration reactions
23. Containers for collection of random urine sample include
- 10 litre jerrycan
 - Bijar bottle
 - McCartney bottle
 - Winchester bottle
 - Universal bottle
24. An increase in urine volume is called
- Anuria
 - Renal dysfunction
 - Oliguria
 - Polyuria
 - Retinopathy

25. What is the expected pH range of a freshly voided urine specimen
- a) 3.5 to 8.0
 - b) 3.5 to 9.0
 - c) 4.0 to 8.5
 - d) 4.5 to 8.0
 - e) 1.0 to 2.0
26. What substance is normally found in urine that is responsible for its yellow coloration?
- a) Bilirubin
 - b) Melanin
 - c) Carotene
 - d) Urochrome
 - e) Creative
27. Patients with diabetes insipidus tend to produce urine with _____ volume with _____ specific gravity
- a) Increased volume decreased specific gravity
 - b) Increased volume increased specific gravity
 - c) Decreased volume decreased specific gravity
 - d) Decreased volume increased specific gravity
 - e) Decreased volume no change in specific gravity
28. The concentrating ability of the kidneys may be measured by performing which of the following urine tests?
- a) Sodium
 - b) Creative
 - c) Volume
 - d) Specific gravity
 - e) Glucose
29. Positive results on benedicts test would be obtained if the urine sample contained which of the following
- a) Urea
 - b) Potassium
 - c) Sucrose
 - d) Ascorbic acid
 - e) DNA

30. Which one of the following can be used to determine specific gravity of urine

- a) TS meter
- b) Ohmmeter
- c) Speedometer
- d) Ion selective electrodes analyzer
- e) Centrifuge

SECTION B

1. (a) Describe TWO methods of regulation of body fluids **(10marks)**
- (b) Outline the following
- (i) functions of body fluids **(5marks)**
 - (ii) The mechanisms of body fluids and electrolytes between different body compartments **(5marks)**
2. Describe the following:
- a) Effect of insulin on carbohydrate and fat metabolism **(10marks)**
 - b) How water balance is maintained during sweating **(10marks)**