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UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (NURSING)

HNS 123: MEDICAL BIOCHEMISTRY 1

DATE: APRIL 10, 2018 **TIME: 8:30 AM- 1:00 PM**

INSTRUCTIONS:

Answer:

All MCQs in Section A;

All Short-answer Questions in Section B

All Long-answer Questions in Section C

Cancelled work should be done neatly by crossing with a single line in the essay and by use of X in the MCQs

SECTION A: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

Choose (CIRCLE/TICK) only one correct answer from the following questions

1. Overall chemical reaction that takes place with in a cell are collectively called as
   A) metabolism
   B) anabolism
   C) complex reaction
   D) catabolism

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2. GPI anchored proteins are:
   A) Peripheral proteins of plasma membrane
   B) Integral proteins of plasma membrane
   C) Proteins which randomly binds to the lipids of plasma membrane
   D) Proteins which bind to ion gated channels in the plasma

3. Glycolipids in plasma membrane are usually located at:
   A) Outer leaflet of plasma membrane
   B) Inner leaflet of plasma membrane
   C) Evenly distributed both inner and outer leaves of plasma membrane
   D) Cannot be predicted, it varies according to cell types

4. Fischer's 'lock and key' model of the enzyme action implies that
   A) The active site is complementary in shape to that of substance only after interaction.
   B) The active site is complementary in shape to that of substance
   C) Substrates change conformation prior to active site interaction
   D) The active site is flexible and adjusts to substrate

5. Enzymes, which are produced in inactive form in the living cells, are called
   A) Papain
   B) Lysozymes
   C) Apoenzymes
   D) Proenzymes

6. In non competitive enzyme activity inhibition, inhibitor
   A) Increases Km
   B) Decreases Km
   C) Does not affect Km
   D) Increases Km

7. In conversion of glucose to glucose-6phsophate, the coenzyme is
   A) Mg++
   B) ATP
   C) Both (A) and (B)
   D) None of these

8. Which of the following has an imino (=NH)group instead of amino group($=NH_2$)?
   A) Proline
   B) Isoleucine
   C) Tyrosine
   D) Serine

9. Complete hydrolysis of cellulose gives
   A) D□fructose
   B) D□ribose
   C) D□glucose
   D) L□glucose

10. In primary dehydration
   A) Intracellular fluid volume is reduced
   B) Intracellular fluid volume remains normal
   C) Extracellular fluid volume is much reduced
   D) Extracellular fluid volume is much increased

11. An important cause of secondary dehydration is
   A) Dysphagia
   B) Oesophageal varices
   C) Oesophageal varices
   D) Gastroenteritis

12. Na+/K+-ATPase along with ATP requires
   A) Ca
   B) Mn
   C) Mg
   D) Cl

13. As the *pKa* of an acid increases, the acid will be
   A) More weaker
   B) More stronger
   C) Converted to neutral solution
   D) Converted to basic solution

13. The primary event in respiratory alkalosis is
   A) Rise in pH
   B) Decrease in pCO_2
   C) Increase in plasma bicarbonate
   D) Decrease in plasma chloride

14. Hypernatremia may occur in
   A) Diabetes insipidus
   B) Diuretic medication
   C) Heavy sweating
   D) Kidney disease

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15. Buffers are mixture of:
    A) Strong acid and strong base
    B) Strong acid and weak base
    C) Weak acid and their conjugate base
    D) Weak base and their conjugate acid

16. Glucose-6-phosphatase is not present in
    A) Liver and kidneys
    B) Kidneys and muscles
    C) Kidneys and adipose tissue
    D) Muscles and adipose tissue

17. Gluconeogenesis is decreased by
    A) Glucagon
    B) Insulin
    C) Epinephrine
    D) Glucocorticoids

18. Proteins contain
    A) Only L- α - amino acids
    B) Only D-amino acids
    C) DL-Amino acids
    D) Both (A) and (B)

19. An aromatic amino acid is
    A) Lysine
    B) Tyrosine
    C) Taurine
    D) Arginine

20. An important function of vitamin A is
    A) To act as coenzyme for a few enzymes
    B) To play an integral role in protein synthesis
    C) To prevent hemorrhages
    D) To maintain the integrity of epithelial tissue

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SECTION B: Answer ALL the questions in this section (40 marks; Use the answer booklet provided)

1.
   a) State the effect of increased concentration of CO_2 on the binding of oxygen to hemoglobin? (1 mark)
   b) Describe the mechanism of this effect (3 marks)
2. Bulk transport across the plasma membrane occurs by exocytosis and endocytosis. Describe (7 marks)
3. Describe the properties of noncompetitive inhibitor of enzymes (4 marks)
4. Describe the difference between configuration and conformation (6 marks)
5. Explain why osmotic pressure from high concentration of dissolved solutes is a serious problem to animal cells. (4 marks)
6. Name fat soluble vitamins and for each state their functions (6 marks)
7. Describe one biological advantage of storing glucose units in branched polymers (glycogen, amylopectin) rather than in linear polymers (5 marks)
8. Describe the distinction between glucogenic and ketogenic amino acids in terms of their metabolic fates (4 marks)

SECTION C: Answer ALL the questions in this section (40 marks; Use the answer booklet provided)

1. Metabolic process in the body depend fully on potential energy generated ATP
   a) Explain the difference between oxidative phosphorylation and substrate level phosphorylation in the formation of ATP (8 marks)
   b) Describe glycolysis (12 marks)
2. Buffers are vital for maintenance of pH to all cells.
   a) State the importance of maintaining pH of biological system (4 marks)
   b) Describe the mechanism by which:
      i) Phosphate buffer system maintains physiological pH of intracellular fluids (8 marks)
      ii) Bicarbonate buffer system maintains physiological pH of the blood (8 marks)

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