CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

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

NURS 115: MEDICAL BIOCHEMISTRY 1

STREAMS: BSC (NURS) Y1S1 **TIME: 2 HOURS**

DAY/DATE: TUESDAY 9/12/2014 **11.30 P.M. – 1.30 P.M.**

INSTRUCTIONS:

PART A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Which of the following organic groups are found occurring in amino acids
   (a) Guanidinium ion
   (b) Indole
   (c) Imidazole
   (d) All of these

2. The pH of a solution is determined by
   (a) Concentration of salt
   (b) Relative concentration of acids and bases
   (c) Dielectric constant of the medium
   (d) Environmental effect

3. Which of the following indicates that the PK of an acid is numerically equal to the PH of the solution when the molar concentration of the acid and its conjugate base are equal?
   (a) Michaelis – Menten equation
   (b) Haldanes equation
   (c) Henderson – Hasselbalch equation
   (d) Hardy – windberg law

4. Molecules in which the atoms are held together by _____bonds have the strongest chemical linkages.
   (a) Noncovalent
   (b) Covalent
   (c) Ionic
   (d) Hydrogen

5. Buffer solutions _____
   (a) Will always have a pH of 7
   (b) Are rarely found in living systems
   (c) Cause a decrease in pH when acids are added to them
   (d) Tend to maintain a relatively constant pH

6. Glycolytic pathway regulation involves:-
   (a) Allosteric stimulation by ADP
   (b) Allosteric inhibition by ATP
   (c) Feedback, or product, inhibition by ATP
   (d) All of the above

7. Why does the glycolytic pathway continue in the direction of glucose catabolism?
   (a) There are essentially three irreversible reactions that act as the driving force for the pathway
   (b) High levels of ATP keep the pathway going in a forward direction
   (c) The enzymes of glycolysis only function in one direction
   (d) Glycolysis occurs in either direction

8. Which of the following amino acids can form hydrogen bonds with their side (R) groups?
   (a) Asparagine
   (b) Aspartic acid
   (c) Glutamine
   (d) All of these

9. The isoelectric point of amino acid is defined as the pH
   (a) Where the molecule carries no electric charge
   (b) Where the carboxyl group is uncharged
   (c) Where the amino group is uncharged
   (d) Of maximum electrolytic mobility

10. When the amino acid alanine (R-group is CH_3) is added to a solution with a pH of 7.3, alamine becomes
   (a) A cation
   (b) Nonpolar
   (c) A zwitherion
   (d) An isotone

11. What is an example of a 5 – carbon sugar?
   (a) Glucose
   (b) Ribose
   (c) Fructose
   (d) Sucrose

12. What elements are carbohydrates composed of?
    (a) C, H, O & S
    (b) C, H, O & N
    (c) C, H, & O
    (d) C, H & N

13. What is a long chain of sugar molecule called?
    (a) Polypeptide
    (b) Polysaccharide
    (c) Protein
    (d) Lipid

14. What is the principal carbohydrates product in animals?
    (a) Glycogen
    (b) Starch
    (c) Cellulose
    (d) Protein

15. What is the name for two amino acids bonded together?
    (a) Disaccharide
    (b) Dipeptide
    (c) Protein
    (d) Alanine

16. What is a triglyceride composed of?
    (a) 3 glycerol with a fatty acid
    (b) One glycerol with 3 fatty acids
    (c) 3 glycerides
    (d) 3 fatty acids

17. Why is a saturated fat called a “saturated” fat?
    (a) The fat is saturated with water
    (b) The fatty acid carbon chains are saturated with hydrogen
    (c) The fatty acid chains can have more added
    (d) They saturate the body with fat when eaten

18. What name is given to glucose, fructose & galactose?
    (a) Non-reducing sugars
    (b) Disaccharides
    (c) Monosaccharaides
    (d) Polysaccharides

19. Which carbohydrate is a long unbranched chain of beta-glucose molecules, which is indigestible to mammals?
    (a) Cellulose
    (b) Lactose
    (c) Glycogen
    (d) Starch

20. There are twenty (20) naturally occurring amino acids and the many combinations of these monomers gives use to a huge number of proteins, all with different functions. One use of proteins in the human body is as enzymes. Which of these bonds holds an enzyme in its tertiary structure?

(a) Oxygen bonds
(b) Hydrogen bonds
(c) Carbon bonds
(d) Nitrogen bonds

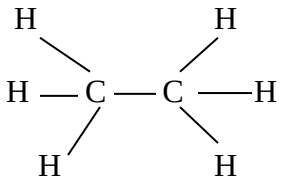
PART B: SHORT ANSWER QUESTIONS (30 MARKS)

1. State the chemical elements that form most of living biological matter. [3 marks]

2. Living beings are made of organic and inorganic substances. Explain. [6 marks]

3. Briefly explain four functions of the organic molecules for living beings. [8 marks]

4. An example of a structural representation is shown below



Draw a structural representation of the amino acid, aspartic acid which has the side chain of CH_2COOH. [5 marks]

5. State four (4) functions of enzymes. [4 marks]

6. State four (4) properties of water. [4 marks]

PART C: LONG ANSWER QUESTION (20 MARKS)

1. Glycolysis literally means "splitting sugars". With the acid of diagram, describe the process of glycolysis. [20 marks]
