

**Multiple Choice.** Put the letter corresponding to the correct answer in the space provided. (1 point)

\_\_\_1) Which of the following is/are reducing sugar(s)?

I. D-Galactose    II. Sucrose    III.  $\alpha$ -D-Mannose    IV. Lactose

- (a) I, III and IV    (b) II, III and IV    (c) I only    (d) II and IV  
(e) none are reducing sugars because they are cyclic

\_\_\_2) The L and D designation of a monosaccharide refers to

- (a) the monosaccharide's enantiomeric forms  
(b) the monosaccharide's optical activity  
(c) the configuration at the penultimate carbon  
(d) both a and c  
(e) none of the above

\_\_\_3) Which of the following is/are TRUE of facilitated diffusion?

- I. the transported molecule must be small, ie. H<sub>2</sub>O or O<sub>2</sub>  
II. the molecules are moved from low to high concentration  
III. the consumption of energy is required  
IV. transport is non-specific

- (a) I and IV    (b) all are true    (c) II and IV    (d) III only    (e) none are true

\_\_\_4) The groups responsible for the immune response that occurs when the wrong blood type is given to someone are

- (a) sugars    (b) proteins    (c) lipids    (d) sugars, proteins & lipids    (e) proteins & sugars

\_\_\_5) Which of the following is not a category of amino acids?

- (a) non-polar    (b) non-polar and charged    (c) polar and uncharged    (d) acidic  
(e) all of the above are categories of amino acids

\_\_\_6) Niemann/Pick disease is caused by a lack of

- (a) permeases    (b) glycolipids    (c) sphingomyelinase    (d) arachidonic acid  
(e) none of the above

\_\_\_7) The correct molecular formula for oleic acid is

- (a)  $C_{17}H_{31}COOH$       (b)  $C_{16}H_{33}COOH$       (c)  $C_{17}H_{33}COOH$       (d)  $C_{15}H_{31}COOH$   
 (e) None of the above

\_\_\_8) The side chain of which amino acid is MOST LIKELY to be found at the active site of a protein?

- (a) glu      (b) ala      (c) gly      (d) his  
 (e) no amino acid side chains are located in the active site

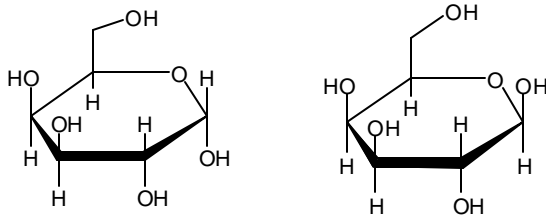
\_\_\_9) Which of the following is/are **not** functions of proteins?

- I. structural support      II. enzymatic catalysts      III. carry genetic information  
 IV. nutritional storage      V. transport
- (a) I only      (b) I, III and V      (c) III only      (d) I, II, IV and V  
 (e) all are functions of proteins

\_\_\_10) Which of the following binds iodine, turning the solution a blue color?

- I. amylose      II. glycogen      III. cellulose      IV. amylopectin
- (a) I and IV      (b) I only      (c) IV only      (d) I, II, III and IV  
 (e) none will produce a blue color after adding iodine

\_\_\_11) The following molecules are



- (a) anomers      (b) enantiomers      (c) meso compounds  
 (d) a and b      (e) none of the above

Name\_\_\_\_\_

12) Structurally, amylopectin is similar to

- (a) amylose      (b) glycogen      (c) cellulose      (d) sucrose  
(e) none of the above

13) A phosphoglyceride that contains a choline group is called a

- (a) eicosanoid      (b) sphingolipid      (c) glycolipid      (d) cephalin  
(e) none of the above

**Short answer.** Provide a **CONCISE** answer to **4 of the 5** following questions. (5 points each)

14) List the three letter code of all amino acids that are considered polar but neutral.

15) Why is HDL considered good and LDL is considered bad?

16) Is sucrose a reducing sugar? Why or why not

17) Are the fatty acids in our bodies mostly saturated or unsaturated? Explain the reason for this.

Name \_\_\_\_\_

18) What is the favored conformation of glucose (boat vs. chair)? Why?

19) **Draw 3 of the following 4** structures. If applicable **label** the anomeric carbons and glycosidic bonds. (5 points each)

a) Mutarotation of Mannose

b) Mutarotation of Lactose

c) Steroid nucleus

d) Two D-galactopyranose molecules connected by an  $\alpha$ -1,6 glycosidic bond.

Name\_\_\_\_\_

20) **Draw ONE** of the following peptides. Label all  $\alpha$  carbons, the N-terminus and C-terminus.  
Circle all side chains and label them according to their class. (10 points)

a) **ser - lys - tyr - his - asp**

b) **asn - lys - phe - cys - ala**

c) **phe - pro - met - gly - ser**

Name \_\_\_\_\_

**21) Matching.** Match the structures / molecular formulas on page 9 with the descriptions below. More than one structure may fit each description. Be sure to include **all** the letters corresponding to the correct structures in the space next to the description. If **no** structure fits, draw an X in the space. (2 points each)

reducing sugar \_\_\_\_\_

cephalin \_\_\_\_\_

phosphoglyceride \_\_\_\_\_

sphingolipid \_\_\_\_\_

sphingosine \_\_\_\_\_

glycolipid \_\_\_\_\_

saturated fatty acid \_\_\_\_\_

lecithin \_\_\_\_\_

unsaturated fatty acid \_\_\_\_\_

pyranose \_\_\_\_\_

cholesterol \_\_\_\_\_

steroid \_\_\_\_\_

**22)** Select **two** of the three topics below and explain in **detail**, using words and pictures (9 points each)

- a) Compare and contrast glycogen and cellulose. Include structural and functional information.
- b) People with the disease hypercholesterolemia have reduced ability to make LDL receptors. Many of them die from heart attacks early in life. Explain this and include cholesterol regulation and arteriosclerosis.
- c) Explain the mode of action and side effects of aspirin. Include a discussion of eicosanoids (their synthesis and role).
- d) Compare and contrast the three methods of membrane transport discussed in class.

