

(5) 1. Circle the following monosaccharides which are **aldoses**.

glucose fructose ribose glyceraldehyde dihydroxyacetone

(5) 2. Circle the following monosaccharides which are **pentoses**.

fructose galactose ribose threose ribulose

Page	Points
1	_____
2	_____
3	_____
4	_____
Total	_____

(4) 3. Identify the following pairs as **enantiomers**, **epimers**, or **anomers**. More than one term may apply to a pair.

_____ (a) α -D-galactose and β -D-galactose

_____ (b) D-threose and D-erythrose

_____ (c) α -D-mannose and α -L-mannose

_____ (d) α -D-glucose and α -D mannose

(4) 4. Circle each of the following terms which is a correct description of the disaccharide **sucrose**:

β -fructoside ketal hemiacetal β -glucoside

furanoside pyranoside reducing sugar α -galactoside

(4) 5. Give the **name** and draw the **structure** of:

(a) the disaccharide found in milk.

(b) the monosaccharide building block of **chitin**, the major structural polymer of insects.

(9) 6. **Circle** the following lipids which are negatively charged at pH 6, and **underline** those that contain a nitrogen atom.

phosphatidyl choline phosphatidyl serine phosphatidyl glycerol

cholesterol sphingomyelin palmitic acid

phosphatidic acid phosphatidyl inositol sialic acid

- (12) 7. Complete the following table by supplying the missing information on each fatty acid. Be sure to show the double bonds in the correct *cis* or *trans* orientation.

Abbreviation.	Common Name	Systematic Name	Structure	Omega designation
9,12-C _{18:2}				
	Arachidonic Acid			
		9-Octadecenoic Acid		

- (4) 8. What is the name for the following lipids?
- (a) The fatty acid amide of sphingosine. _____
 - (b) The glucoside of the compound described in part (a). _____
 - (c) A glycerophospholipid with a vinyl ether linkage at C-1 of glycerol. _____
 - (d) Another name for lecithin. _____
- (6) 9. Distinguish between integral and peripheral membrane proteins in terms of
- (a) types of solutions used to extract them from membranes.
 - (b) forces by which they are attached to membranes.
 - (c) membrane location in the fluid mosaic model.

- (6) 10. Phosphatidyl ethanolamine and lysophosphatidyl ethanolamine form different types of aggregate structures. Describe the different structures (words or diagram), and explain what structural difference between the two lipid molecules accounts for this difference.
- (10) 11. Classify each of the following transport systems according to the terms in the list at the right by putting the appropriate letter or letters in the blank next to the transport system. More than one term may apply.
- | | |
|--|-------------------------------|
| _____ glucose transporter of erythrocytes | a. primary active transport |
| _____ anion transporter of erythrocytes | b. secondary active transport |
| _____ Na^+/K^+ ATPase of plasma membrane | c. symport |
| _____ Ca^{2+} ATPase of sarcoplasmic reticulum | d. antiport |
| _____ amino acid uptake driven by a Na^+ gradient | e. uniport |
| | f. facilitated diffusion |
- (4) 12. Suggest two experimental features that would distinguish between passive diffusion and facilitated diffusion in the transport of a substance across a cell membrane.
- (8) 13. Draw the structure of the following, showing the bases in their proper tautomeric form.:
- (a) guanine (b) uracil
- (c) a **ribonucleoside** containing adenine (d) a **deoxynucleotide** containing cytosine

- (6) 14. Describe three major structural differences between DNA and RNA.
- (5) 15. You have isolated two unidentified bacteria, initially designated **strain x** and **strain y**. The DNA of **strain x** contains 28% adenine, and the DNA of **strain y** contains 18% adenine. What is the complete DNA composition from each strain? DNA from which strain should have the higher melting temperature?
- (2) 16. DNA from a bacterial virus was isolated and found to have the composition 21% A, 28% G, 26% T and 24% C. What would you conclude about the structure of this DNA?
- (6) 17. Which form of DNA (**A**, **B**, or **Z**) (Put answer in blank)
- _____ has the greatest tilt angle of the base pairs?
- _____ has deoxyguanosine in the **syn** conformation?
- _____ is favored by high GC content?
- _____ has a left-handed helix?
- _____ is favored by low humidity?
- _____ is formed by RNA double helices?