CHEM 4400 Sugar Worksheet Fall 2016 Dr. Stone Name_____

1. Define the following terms and draw structures of example molecules:
   a. diastereomers

   b. anomers

   c. epimers

   d. enantiomers

2. Complete this table, by drawing in the correct structures

Sugar	β	linear	α
D-Mannose			
D- Glucose			
D-Fructose			
D-Galactose			

3. Briefly describe the structure and function of the following:
   A) Amylose

   B) Amylopectin

   C) Glycogen

   D) Cellulose

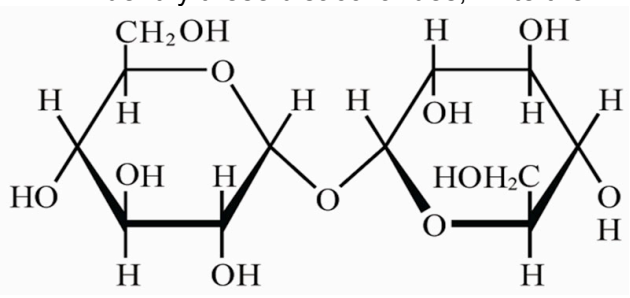
   E) Chitin

4. Why do plants and animals store “quick” energy as high molecular weight branched polmers.

5. What is high fructose corn syrup toxic?

6. When glucagon binds to its receptor on a liver cell, a chain of events occurs that ultimately increases blood glucose levels. Describe this chain of events.

7. Identify these disaccharides, write their name in the blank, circle any free anomeric carbons.



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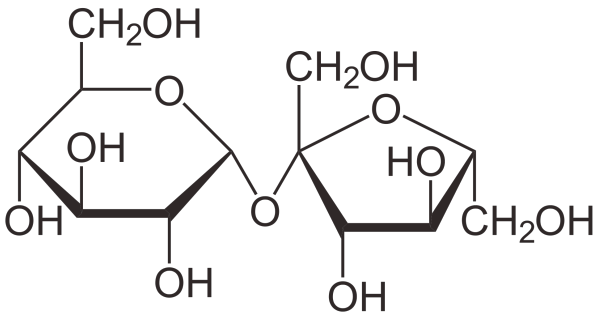

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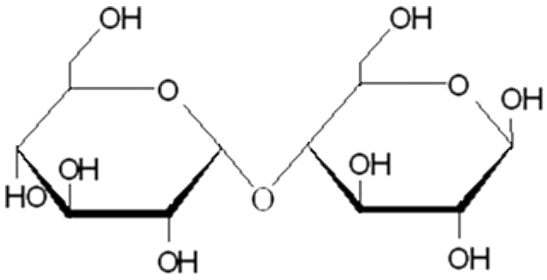

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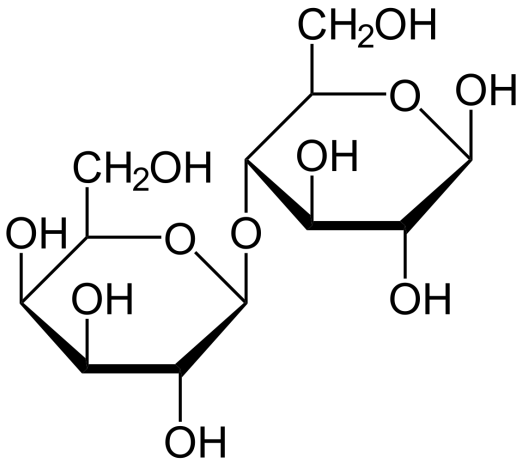

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8. Which of the above disaccharides is(are) (a)non reducing sugar(s)? What makes a sugar "non reducing"?

9. Complete the following table

Name of disaccharide	monomers	linkage	Where is this disaccharide found and/or what is its function?
Lactose			
Trehalose			
Sucrose			
Maltose			

10. What adverse effects are associated with each of the following sweeteners:
    a. aspartame (Equal, blue stuff)

    b. sucralose (yellow stuff)

    c. saccharin (SweetnLow, pink stuff)

    d. sucrose (table sugar, white stuff)

    e. Steviol (white packet, green label)

11. Give the best answer for the following questions:

A) Give an example of a heteropolymer of glucose derivatives, that provides structural support in cartilage.

B) Proteins that “read the sugar code” bind to specific oligosaccharides, what are these proteins called?

C) A newer test that measures a patient’s regulation of blood glucose detects a protein that reacts with glucose. What is the name of this glucose-protein adduct?

D) What heteropolymer of glucose derivatives is the mostly highly negatively charged biomolecule and provides a binding site for antithrombin and thrombin?

E) What very large heteropolymer of glucose is found in the vitreous humor of the eyeball?

F) What molecule is on the outside of endothelial cells and binds to oligosaccharides on leukocytes to slow them down in the blood flow?

G) What type of molecule is responsible for the A,B,O blood groups?

H) What tetramer derivative of lactose helps human infants develop good intestinal bacteria?