FLINN SCIENTIFIC

Name_____

Laboratory Report

Sample	Iodine Test		Benedict's Test		Barfoed's Test		Seliwanoff Test		Identity
	Color	+/–	Color	+/–	Color	+/–	Color	+/–	
Blank									
A									
B									
C									
D									
E									

**Note:* Samples may be removed from further testing once their identities have been revealed by a prior test in the sequence. Those test boxes may be shaded.

1. Maltose, a product of partial digestion of starches, is a disaccharide composed of two glucose units. It is a reducing sugar. In your mind, take maltose through the sequence of classification tests used in this experiment. Would you be able to distinguish maltose from lactose in an unknown sample?

2. When disaccharides are heated in water in the presence of a strong acid, the linkage joining the two monosaccharide components is "broken" (a reaction called hydrolysis). Using this information, explain why sucrose might give a false positive result with the Seliwanoff reagent.

3. Fill in the following blanks to identify the reactants that undergo oxidation and reduction, respectively, when glucose reacts with Benedict's solution. Name the oxidizing and reducing agents involved.

   Substance oxidized: _____ Oxidizing agent: _____

   Substance reduced: _____ Reducing agent: _____

4. Prior to the advent of more accurate enzyme methods to analyze the amount of glucose in urine (a test for diabetes), the presence of glucose was routinely detected using tablets containing the solid reagents needed for Benedict's test. Describe a disadvantage of this method of testing for glucose.

5. Fructose is used as a lower calorie and lower cost sweetener than table sugar. Explain how and why this statement might be true.

6. Glucose is classified as an aldose because it contains an aldehyde functional group in its open-chain form. In aqueous solution and in cells, however, the aldehyde group undergoes internal cyclization with the C_5–OH group to form the cyclic structure shown below and in Figure 1. The open-chain and cyclic structures are in equilibrium, with >97% of the molecules typically in cyclic form. Use LeChâtelier's principle to explain why all glucose molecules will react with Cu^{2+} ions, even though Cu^{2+} reacts only with the aldehyde functional groups.