SBI4U: Carbohydrates Worksheet

1. Which elements do carbohydrates contain, and in what ratio? \(1C:2H:1O\)

2. If a sugar compound has 11 oxygen atoms, how many hydrogen atoms does it contain? \(22\)

3. Based on their molecular formulas, which of the following are NOT carbohydrates?
   a. \(C_3H_6O_3\)  
   b. \(C_{10}H_{18}O_9\)  
   c. \(C_{18}H_{32}O_{16}\)  
   d. \(C_4H_8O_2\)  
   e. \(C_{16}H_{32}O_2\)  
   f. \(C_4H_{12}O_6\)

4. For each molecule below, state if it is a monosaccharide, a disaccharide, or a polysaccharide:
   a. Fructose Monosaccharide  
   b. Ribose Monosaccharide  
   c. Cellulose Polysaccharide  
   d. Glucose Monosaccharide  
   e. Sucrose Disaccharide  
   f. Glycogen Polysaccharide  
   g. Chitin Polysaccharide  
   h. Starch Polysaccharide  
   i. Maltose Disaccharide

5. Describe a biological function for each of the following carbohydrates
   a. Cellulose - structural support in plants  
   b. Ribose - nucleotides for RNA contain ribose sugar (deoxyribose in DNA)  
   c. Starch - energy storage of glucose in plants  
   d. Glycogen - energy storage of glucose in animals  
   e. Deoxyribose - nucleotides that make up DNA contain deoxyribose sugar  
   f. Chitin - structural support of soft-shelled organisms links to peptide to form backbone  
   g. Glucose - primary source of energy

6. Complete these word equations
   a. Glucose + glucose \rightarrow Maltose + water  
   b. Glucose + fructose \rightarrow Sucrose + water  
   c. Monosaccharide + monosaccharide \rightarrow Disaccharide + water  
   d. Disaccharide + water \rightarrow Monosaccharide + Monosaccharide

7. Briefly describe the process of a condensation reaction for carbohydrates. (You may use a diagram)
   *be sure to include all reactants and products

8. What type of linkage is found in a disaccharide? (2 possibilities) \((1-4 \ or \ 1-6)\)glycosidic linkage

9. Briefly describe the process of the hydrolysis reaction for carbohydrates. (You may use a diagram)
SBI4U: Lipids Worksheet

1. What are the 4 types of lipids and what are their main functions?
   1. Phospholipids
   2. Triglycerides
   3. Sterols
   4. Waxes

2. Compare and contrast the following pairs of terms:
   saturated and unsaturated
   - no double bonds
   - one or more double bonds
   - solid at room temp
   - liquid at room temp
   ...etc

   trans-fat and cis-fat
   - Hs on same side of double C=C bond
   - C=C bond formed by high heat
   - good fat when consumed in moderation
   - both unsaturated fat

3. What is hydrogenation? Give a real life example.
   - The addition of hydrogen to an unsaturated fat

7. a) Label the following parts of a phospholipid in the boxes provided: wo fatty acid chains, glycerol, phosphate group and choline. Identify which part of the molecule is polar (hydrophilic) and which part is nonpolar (hydrophobic)

8. a) Show how these molecules form a saturated fat.
   b) What type of reaction is this?
   c) What are the reactants?
   d) What are the products?