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. $C_3H_8O_3$ c. $C_{18}H_{32}O_{16}$ e. $C_{16}H_{32}O_2$

b. $C_{10}H_{18}O_9$ d. $C_4H_8O_2$ f. $C_6H_{12}O_6$

4. For each molecule below, state if it is a monosaccharide, a disaccharide, or a polysaccharide:

a. Fructose Monosaccharide d. Glucose Monosaccharide g. Chitin Polysaccharide

b. Ribose Monosaccharide e. Sucrose Disaccharide h. Starch Polysaccharide

c. Cellulose Polysaccharide f. Glycogen Polysaccharide i. Maltose Disaccharide

5. Describe a biological function for each of the following carbohydrates

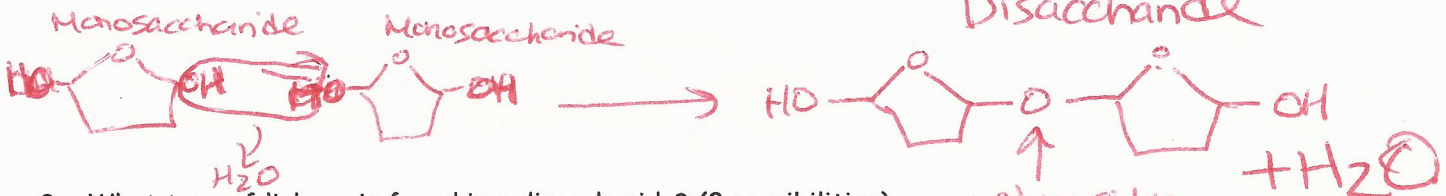
a. Cellulose – structural support in plants
b. Ribose – nucleotides for RNA contain ribose sugar (deoxyribose in DNA)
c. Starch – energy storage of glucose in plants
d. Glycogen – energy storage of glucose in animals
e. Deoxyribose – nucleotides that make up DNA contain deoxyribose sugar
f. Chitin – structureral support of soft shelled organisms
g. Glucose – primary source of energy → links to P group to form backbone

6. Complete these word equations

a. Glucose + glucose → Maltose + water
b. Glucose + fructose → Sucrose + water
c. Monosaccharide + monosaccharide → Disaccharide + water
d. Disaccharide + water → Monosaccharide + Monosaccharide

7. Briefly describe the process of a condensation reaction for carbohydrates. (You may use a diagram)

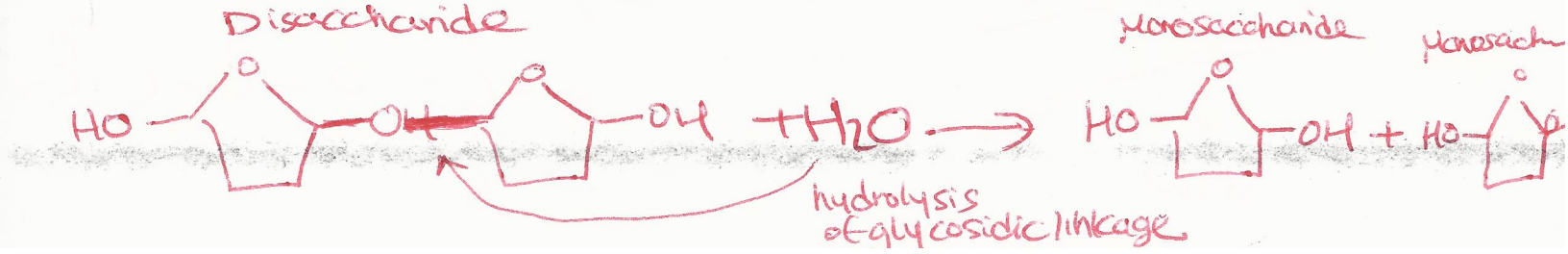
*be sure to include all reactants and products



8. What type of linkage is found in a disaccharide? (2 possibilities)

(1-4 or 1-6)(α or β) 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 — a. main component of cell membranes
2. Triglycerides — b. long term energy
3. Sterols — c. ex/ cholesterol - provides support/fluidity to cell membrane
4. Waxes. — d. protective coating - ex/ bees wax to protect honeycomb.

2. Compare and contrast the following pairs of terms:

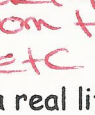
saturated and unsaturated

- no double bonds
- max # of Hs
- solid at room temp
- ...etc

- one or more double bonds
- less than max # of H's
- liquid (semi-solid / thick liquid at room temp.
- ...etc

trans-fat and cis-fat

- H's on opposite sides of double C=C bond



- bad fat
- created by high heat

- H's on same side of double C=C bond

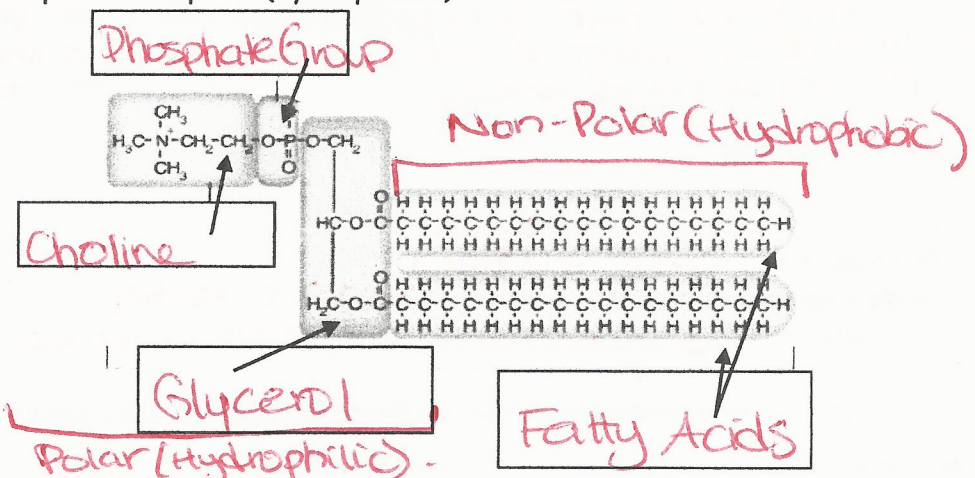
- good fat when consumed in moderation

- both unsaturated fat
- unsaturated fat

3. What is hydrogenation? Give a real life example.

The addition of Hydrogen to an unsaturated fat, which removes double bonds and makes it more saturated. Ex/ Margarine is hydrogenate vegetable oils.

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? Dehydration Synthesis / Condensation
c) What are the reactants? 1 Glycerol, 3 Fatty Acids
d) What are the products? Triglyceride, $3H_2O$