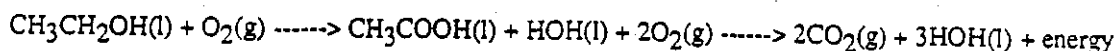
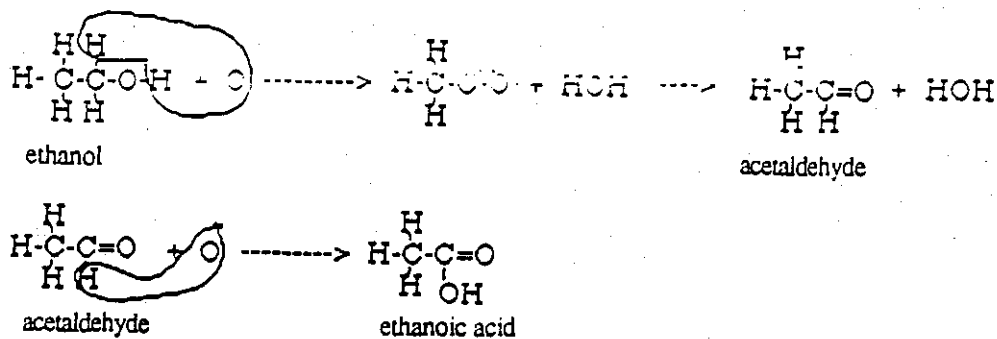
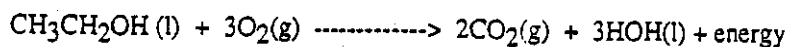




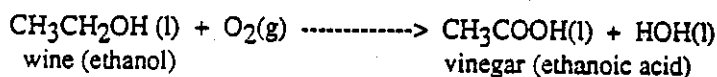
When ethanol is metabolized in the body, the alcohol is first converted to acetaldehyde and then to ethanoic acid (acetic acid = vinegar).



The final products of ethanol reacting with oxygen are carbon dioxide and water.



This same process causes wine to turn to vinegar. When you are offered a bottle of wine in a restaurant, the waiter waits for you to taste it so that you can be sure that oxygen has not gotten into the bottle and turned the wine to vinegar. Wine bottles are stored on their sides to keep the cork moist and tight in the bottle to keep the oxygen gas out! Note that with only one mole of oxygen, wine turns to vinegar.

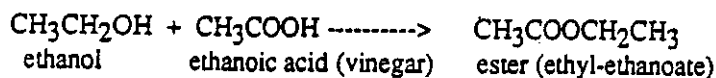


**Esters** are formed when fatty acids reacts with alcohols. The functional group of all esters is  $-\text{COOR}$ . The bond angle around the carbonyl carbon is  $120^\circ$  with a trigonal planar configuration. Natural scents and flavors of many flowers and fruits are due to esters. Artificial fruit flavors are made by mixing several esters to give the flavor and aroma of the natural product. The natural flavors and odors are not exactly duplicated, but most people can be fooled. Although the "fruity" tastes and odors of esters are pleasant, they are not used to make perfumes. This is because ester groups can react with perspiration, changing the esters back into carboxylic acids and alcohols. Carboxylic acids do not have pleasant odors. Remember, butyric acid is body odor! On the other hand, methyl-butyrate and ethyl-butyrate are the esters of apple and pineapple, respectively. Perfumes are made from hydrocarbons and ketones. Esters are used only for the cheapest toilet waters.



#### More about drinking alcohol

When a person has been drinking for a while and continues to drink, the alcohol can react with the ethanoic acid (acetic acid) which is in the blood from the metabolism of the previously drunk alcohol to produce an ester (ethyl-ethanoate). The ester is not tolerated well by the body, and the person gets sick and vomits. The ester produces the morning-after sweet breathe associated with hang overs.

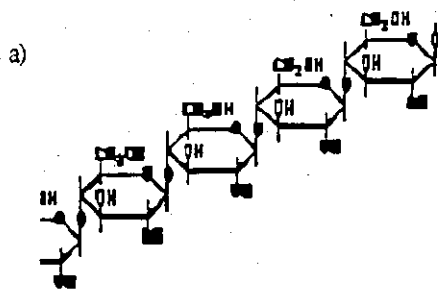


When large amounts of ethanol are drunk, the alcohol can react to produce ethyl ether. Ethyl ether used to be used as an anesthetic. It has the same effect on a person who drinks heavily, causing the person to pass out. If a lot of alcohol is chugg-a-lugged, the drinker may pass out before vomiting. This can cause death.



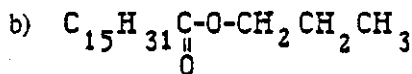
## Self Test 8.5

1. Match the following



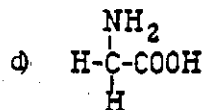
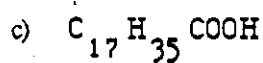
\_\_\_\_\_ fatty acid

\_\_\_\_\_ carbohydrate



\_\_\_\_\_ amino acid

\_\_\_\_\_ ester



2. Proteins are composed of

a) amines

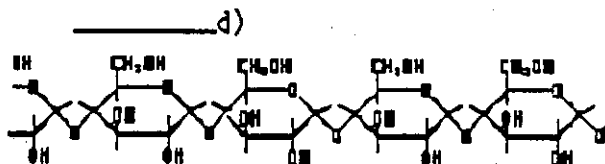
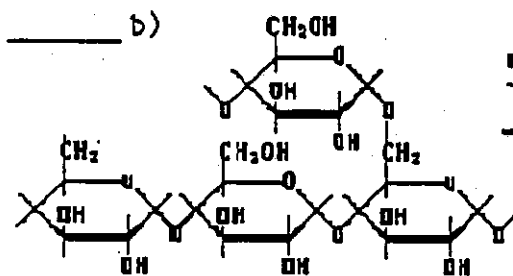
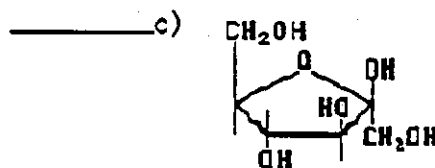
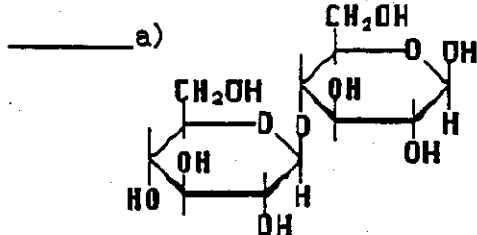
b) carboxylic acids

c) fatty acids

d) carbohydrates

e) amino acids

3. Indicate whether each of the following is a monosaccharide, disaccharide, or polysaccharide.



4. List the following in order of most saturated to least saturated.

a) Promise Margarine® in a tub \_\_\_\_\_ most saturated

b) Crisco® \_\_\_\_\_

c) butter \_\_\_\_\_

d) sunflower oil \_\_\_\_\_

e) peanut oil \_\_\_\_\_ least saturated