CHEM 102 C(assignment)

1a) The first classification of alcohol is based on the number of hydrogen atoms attached to the carbon atoms containing the hydroxyl group. If the number of hydrogen atoms are three or two it is a primary alcohol and if the number of hydrogen atom is attached, it is a tertiary alcohol. Eg. CH_3OH (primary alcohol), $CH_3CH(OH)CH_3$ (secondary alcohol), $(CH_3)_3-C-OH$ (tertiary alcohol)

b) The second classification of alcohols is based on the number of hydroxyl groups they possess. If one hydroxyl group is present, it is monohydric alcohol. If two hydroxyl groups are present, it is a dihydric alcohol and if its three hydroxyl groups it is a trihydric alcohol. Polyhydric alcohols have more than 3 hydroxyl groups. $CH_3CH_2CH_2OH$ (monohydric), $HOCH_2CH_2OH$ (Dihydric), $OHCH_2CH(OH)CH_2OH$ (trihydric alcohol).

2) Solubility - Lower alcohols with up to 3 carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols increases with increasing relative molecular mass. All monohydric alcohol are soluble in organic solvents.

3) The starch containing ~~molecule~~ material is warmed with malt to 60°C for a period of time and converted into maltose by the enzyme diastase contained in the malt.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[\text{diastase}]{60^\circ C} nC_{12}H_{22}O_{11}$$

Carbohydrate

The maltose is broken down into a glucose on addition of yeast watch contains the enzyme maltose and at a temperature of 15°C

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[\text{maltose}]{15^\circ C} 2C_6H_{12}O_6$$

Glucose.

The glucose at a constant temperature of 15°C is then converted into alcohol by the enzyme ~~also~~ zymase also in yeast.

$$C_6H_{12}O_6 \xrightarrow[\text{zymase}]{15^\circ C} 2CH_3CH_2OH + 2CO_2.$$

Glucose — Ethanol

4) $CH_3CH(CH_3)CHO + C_4H_9MgCl \xrightarrow{(C_2H_5)_2O} CH_3CH(CH_3)-C(C_4H_9)-OMgCl$

$\xrightarrow[\text{dil acid}]{H_2O} CH_3CH(CH_3)-C(C_4H_9)-OH + MgClOH$

7) $CH_3CH(CH_3)CHO \xrightarrow{LiAlH_4/(C_2H_5)_2O} CH_3CH(CH_3)CH_2OH$

8) $CH_3CH_2CH_2OH + H_2SO_4 \longrightarrow CH_3CH_2CH_2OH_2OSO_3H$

$\downarrow -H_2O$

$CH_3CH_2CH_2OSO_3H$

$CH_3CH_2CH_2OSO_3H \longrightarrow CH_3CH=CH_2 + H_2SO_4$

$CH_3CH=CH_2 + H_2O \longrightarrow CH_3CH(OH)CH_3$