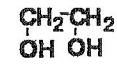
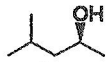
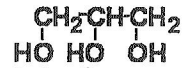
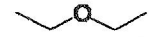
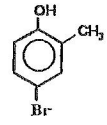
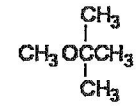
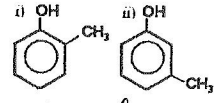
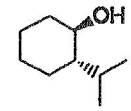
GROUP HOMEWORK #4

CHEM 121, section 1, **Printed Name:** key

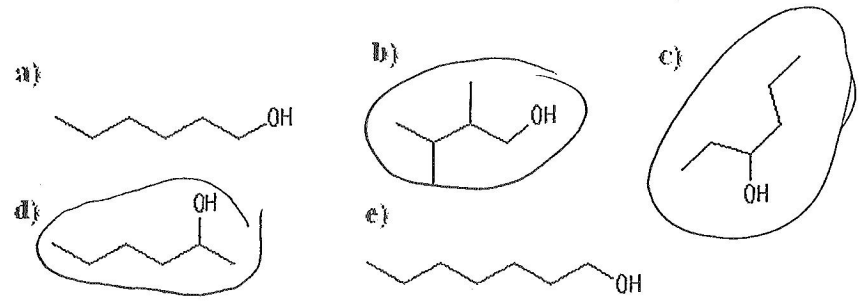
Chapter. 14. Alcohols, Phenols, and Ethers

Homework Due **Group Name:**

1) (3 pts) Identify the Alcohols, Phenols, and Ethers from the following and give their common and/or IUPAC names.

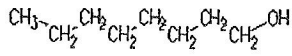
a) CH_3-CH_2-OH Type: alcohol Name: ethyl alcohol / ethanol	b)  Type: phenol Name: phenol	c)  Type: diol Name: ethylene glycol / ethane-1,2-diol
d)  Type: alcohol Name: 4-methyl-2-pentanol	e)  Type: triol Name: glycerol / glycerine / 1,2,3-propanetriol	f)  Type: ether Name: diethyl ether / ethoxy ethane
g)  Type: cyclic alchol Name: ~~4-methyl-2-pentanol~~ cyclopentanol / cyclopentyl alcohol	h)  Type: phenol Name: 4-bromo, 2-methyl phenol	i)  Type: ether Name: methyl + butyl ether / 2-methoxy-2-methyl propane
j)  Type: thiol Name: ethyl thiol / ethanthiol / ethyl mercaptan	k)  Type: phenols Name: 1) 2-methyl phenol 2) 3-methyl phenol	l)  Type: cyclic alchol Name: 2-isopropyl cyclohexanol

2) (1 pt) Circle the constitutional isomers of 1-hexanol among following alcohols.

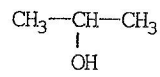


3) (1 pt) Classify each of the following as either 1', 2', or 3' alcohols:

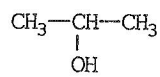
a) Primary (1°)



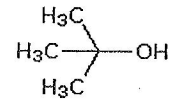
b) secondary (2°)



c) secondary (2°)



d) tertiary (3°)



4) (3 pts) Complete the following reactions of alcohol:

a)

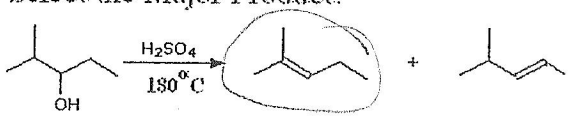
i) $2\,CH_3\text{-}CH_2\text{-}OH \xrightarrow[140^\circ C]{H_2SO_4} CH_3CH_2\text{-}O\text{-}CH_2CH_3 + H_2O$

ii) $CH_3\text{-}CH_2\text{-}OH \xrightarrow[180^\circ C]{H_2SO_4} CH_2{=}CH_2 + H_2O$

b) What is Zaitsev Rule: Hydrogen in the water product of intramolecular dehydration comes from the neighboring carbon with few largest number of alkyl groups

c)

Select the Major Product:



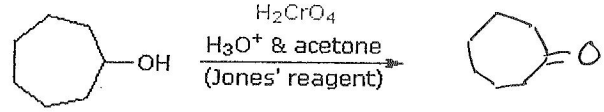
d)

5) (3 pts) Complete the following reactions of alcohol oxidation:

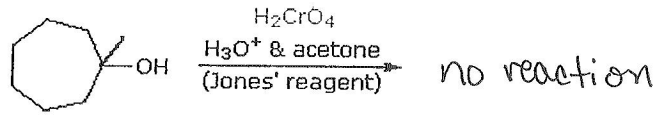
a) Oxidation of 1^{ry} alchohol

$$CH_3\text{-}CH_2\text{-}OH \xrightarrow[(Jones'\ reagent)]{H_2CrO_4,\ H_3O^+\ \&\ acetone} CH_3C(=O)H \xrightarrow[Reagent]{Jones'} CH_3C(=O)OH + [H_2CrO_3]$$

b) Oxidation of 2^{ry} alcohol

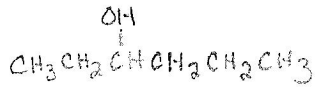


c) Oxidation of 3^{ry} alcohol



6) (3 pts) Draw condensed formula of each of the following:

a. 3-Hexanol

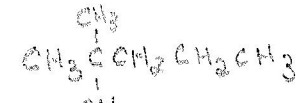


$CH_3CH_2CH(OH)CH_2CH_2CH_3$

b. 1,2,3-Pentanetriol

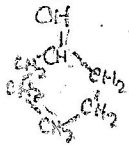
$CH_2(OH)CH(OH)CH(OH)CH_2CH_3$

c. 2-Methyl-2-pentanol



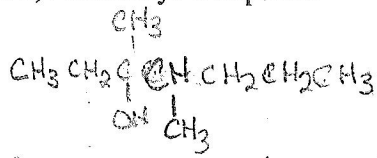
$CH_3C(CH_3)(OH)CH_2CH_2CH_3$

d. Cyclohexanol



$C_6H_{11}OH$

e. 3,4-Dimethyl-3-heptanol



$CH_3CH_2C(CH_3)(OH)CH(CH_3)CH_2CH_2CH_3$

7) (3 pts) Draw the alkene products of the dehydration of the following alcohols:

a. 2-Pentanol: $CH_3CH_2CH_2CH(OH)CH_3 \xrightarrow[180^\circ C]{H_2SO_4} CH_3CH_2CH{=}CHCH_3 + H_2O$

b. 3-Methyl-1-pentanol: $CH_3CH_2CH(CH_3)CH_2CH_2OH \xrightarrow[180^\circ C]{H_2SO_4} CH_3CH_2CH(CH_3)CH{=}CH_2 + H_2O$

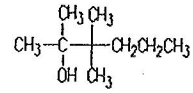
c. 2-Butanol: $CH_3CH(OH)CH_2CH_3 \xrightarrow[180^\circ C]{H_2SO_4} CH_3CH{=}CHCH_3 + H_2O$

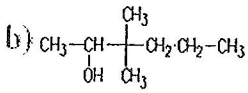
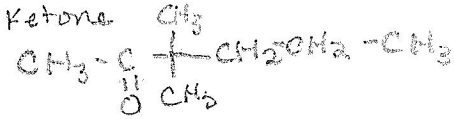
d. 4-Chloro-2-pentanol $CH_3CH(OH)CH_2CH(Cl)CH_3 \xrightarrow[180^\circ C]{H_2SO_4} CH_3CH{=}CH(Cl)CH_3 + H_2O$

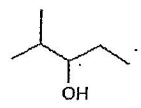
e. 1-Propanol:

$CH_2(OH)CH_2CH_3 \xrightarrow[180^\circ C]{H_2SO_4} CH_2{=}CHCH_3 + H_2O$

8) (3 pts) Give the oxidation products of the following alcohols. If no reaction occurs, write N.R.

a)  $\xrightarrow{[O]}$ N.R

b)  $\xrightarrow{[O]}$ Ketone 

c)  $\xrightarrow{[O]}$ Ketone