JASPERSE CHEM 360 TEST 1 Alcohols and Retrosynthesis VERSION 1

1. Give the major product for the following reactions. (3 points each)

$$\begin{array}{c}
O \\
\hline
\end{array}$$
1.  $MgBr$ 

$$\begin{array}{c}
MgBr \\
\hline
\end{array}$$

Ph 
$$\sim$$
 OH  $\xrightarrow{\text{H}_2\text{CrO}_4}$ 

$$\begin{array}{c}
0 \\
\hline
1. \text{ LiAlH}_4 \\
\hline
2. \text{ H}_3\text{O}^+
\end{array}$$

## 2. Give Names or structures for the following: (9 points)

para-ethylphenol

3. For each of the following pairs, <u>circle</u> the one that is <u>higher boiling</u> and put a <u>square</u> around the one with the <u>higher water solubility</u>. (4 points)

- 4. Which of the following statements is **true**? (4 points)
- a. When an ether solution of **A** and **B** in a separatory funnel is treated with neutral water, only **B** remains in the ether layer.
- b. When an ether solution of **A** and **B** in a separatory funnel is treated with neutral water, neither **A** nor **B** remains in the ether layer.
- c. When an ether solution of **A** and **B** in a separatory funnel is treated with basic water (NaOH/H<sub>2</sub>O), both **A** and **B** remain in the ether layer.
- d. When an ether solution of **A** and **B** in a separatory funnel is treated with basic water (NaOH/H<sub>2</sub>O), only **B** remains in the ether layer.

$$\bigcap_{A}^{\text{OH}} \bigcap_{B}^{\text{OH}}$$

- 5. For the following transformation, which of the following statements is true? (4 points)
- a. **D** is the only acceptable solvent
- b. C is the only acceptable solvent
- c. C and D are both acceptable solvents
- d. B, C, and D are all acceptable solvents
- e. A and B are the only acceptable solvents

Br 1. Mg, solvent OH

2. 
$$H_2C=O$$
3.  $H_3O^+$ 

Solvent Options

 $H_2O$   $CH_3OH$ 
 $A$   $B$   $C$   $D$ 

6. Suggest a possible structure for an unknown **A** whose formula is  $C_5H_{10}O$  and gives the following chemical test results. (5 points)

Formula C<sub>5</sub>H<sub>10</sub>O

Hydrogenation Test  $H_2/Pt$  No reaction Chromic Acid Test  $H_2CrO_4$  Turns Green

Lucas Test HCl/ZnCl<sub>2</sub> Reacts within 5 minutes

7. Provide the mechanisms for the following reactons (3, 5, and 5 points)

$$\begin{array}{c}
O \\
1. \text{ LiAlH}_4 \\
2. \text{ HaO}^+
\end{array}$$

$$\begin{array}{c} O \\ \hline \\ Cl \\ \hline \\ 2. \ H_3O^+ \end{array} \begin{array}{c} OH \\ \hline \\ Me \\ \end{array} \\ \begin{array}{c} OH \\ \\ Me^{\text{"Me"=methyl=CH}_3)} \end{array}$$

$$\underbrace{\stackrel{OH}{\longleftarrow}_{Me}}_{Me} \xrightarrow{H-Br} \underbrace{\stackrel{Br}{\longleftarrow}_{Me}}_{Me}$$

8. Provide the reagents necessary to accomplish the following transformations (4 points each)

$$Ph \longrightarrow Ph \longrightarrow Ph \longrightarrow Ph \qquad (2-3 \text{ steps})$$

$$Ph$$
 OH  $OH$  (4-5 steps)

9. Rank the acidity of the following, from most acidic (1) to least acidic (4). (4 points)

10. Design syntheses of the following. (6 points each). Allowed starting materials (same as practice) include:

cyclopentanol ethylene oxide formaldehyde iodomethane any esters any acyclic alcohol or alkene wth ≤4 carbons any "inorganic" agents (things that won't contribute carbons to your skeleton)

