

**FIRST HOUR EXAM - CHEMISTRY 3331**

**September 24, 2009**

**NAME:** Amawes

**Circle the Time of Your  
Recitation**

**PROBLEM 1.** \_\_\_\_\_

**Monday 8am**

**Monday noon**

**PROBLEM 2.** \_\_\_\_\_

**Monday 5pm**

**Tuesday 8 am**

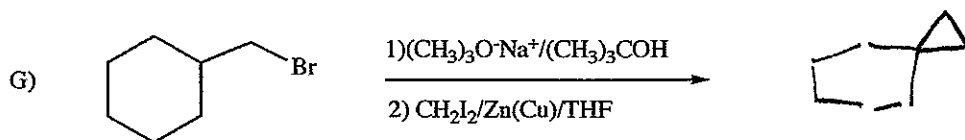
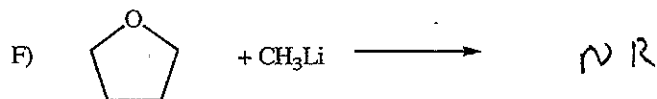
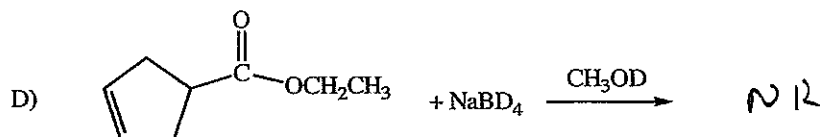
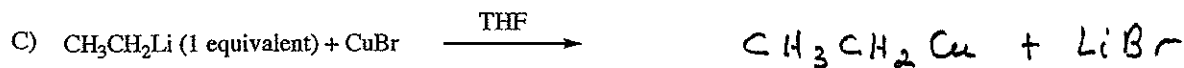
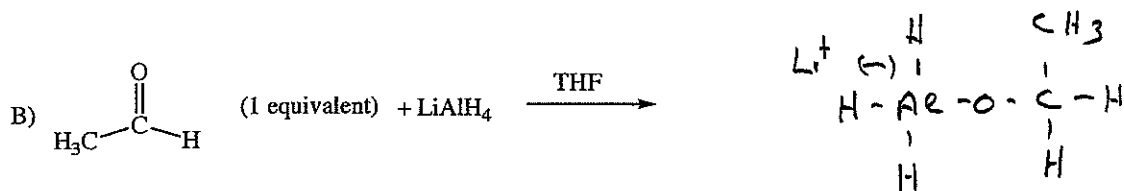
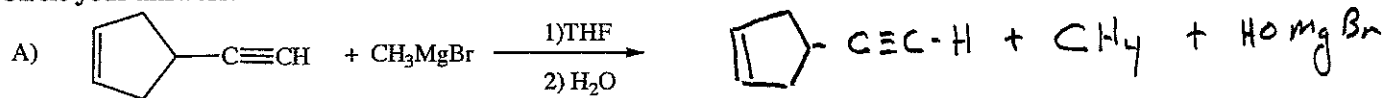
**PROBLEM 3.** \_\_\_\_\_

**Wednesday 8 am**

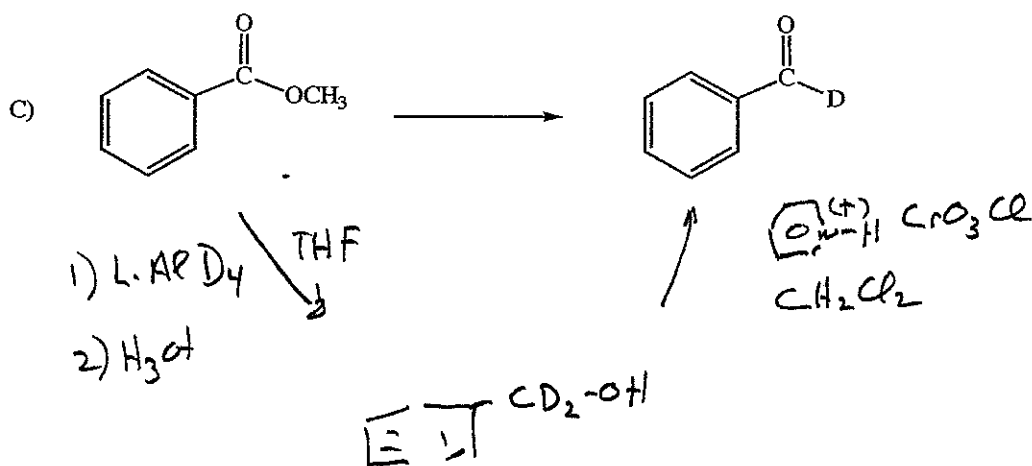
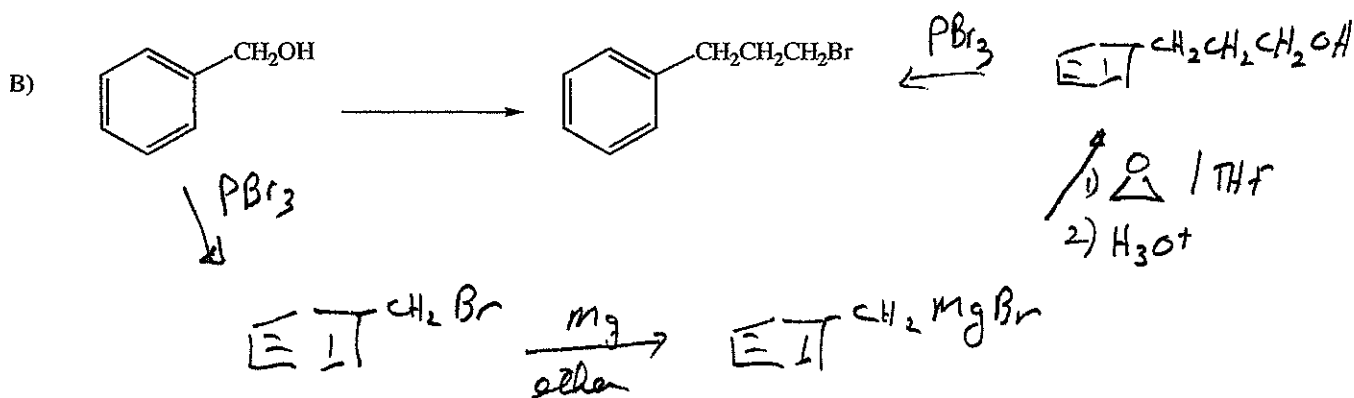
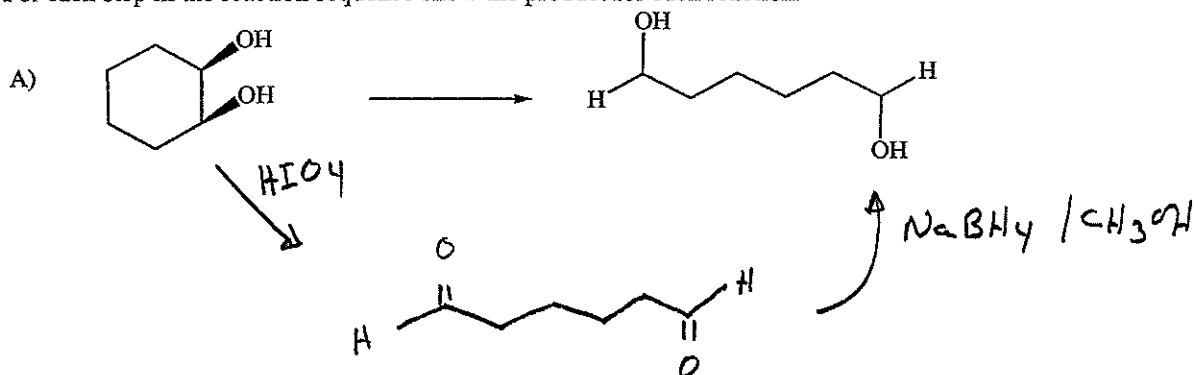
**Wednesday 5pm**

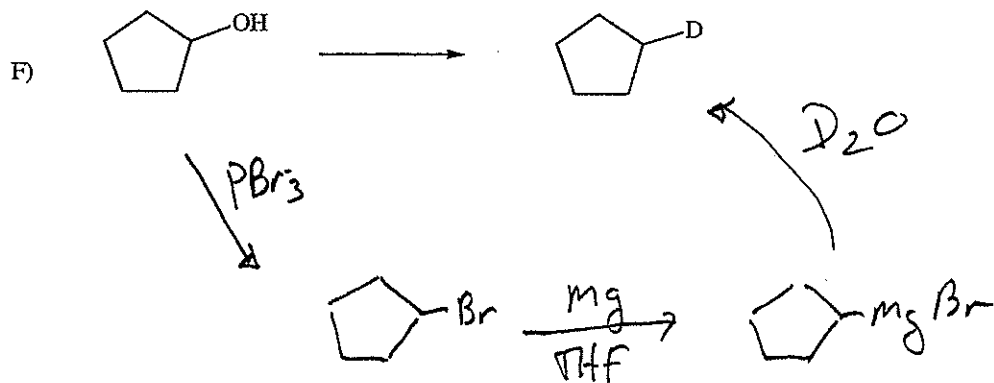
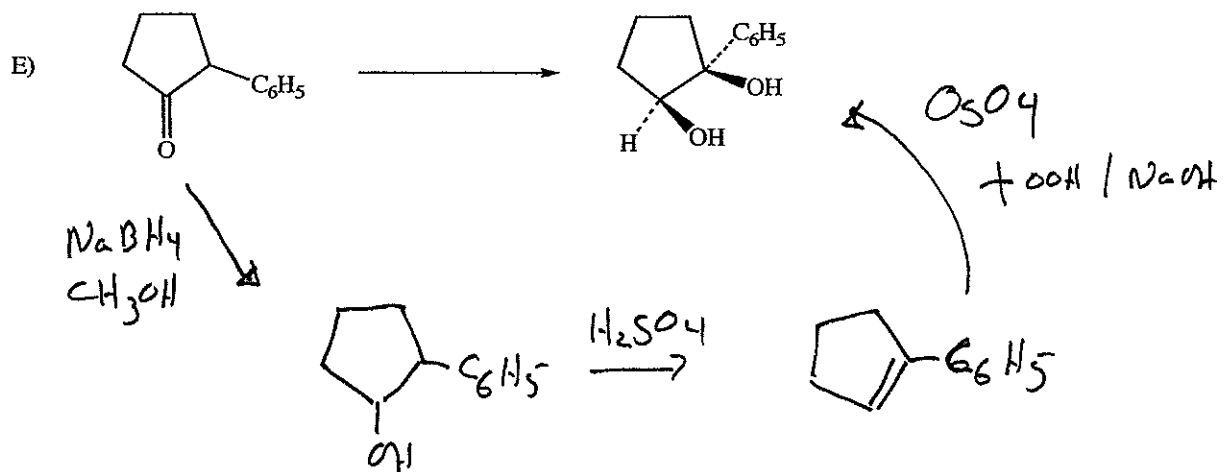
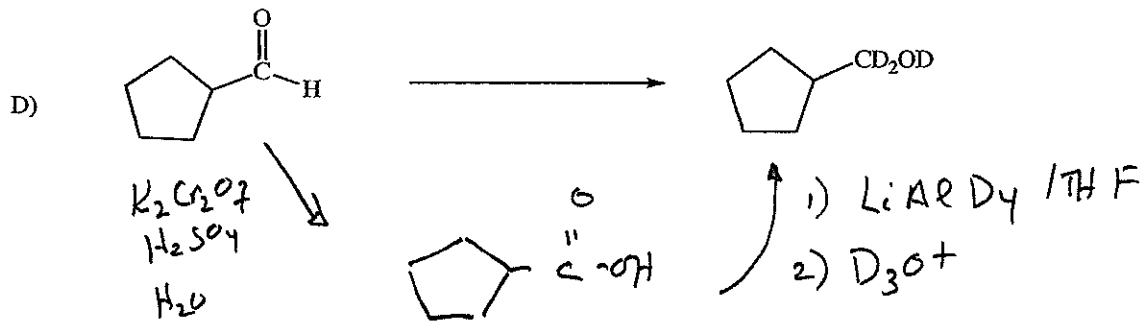
**TOTAL:** \_\_\_\_\_

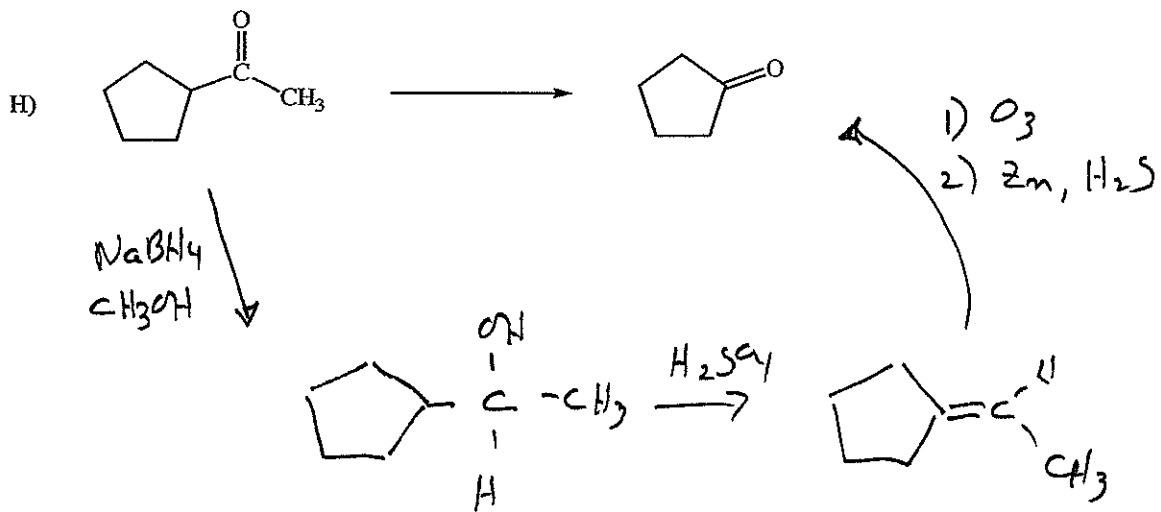
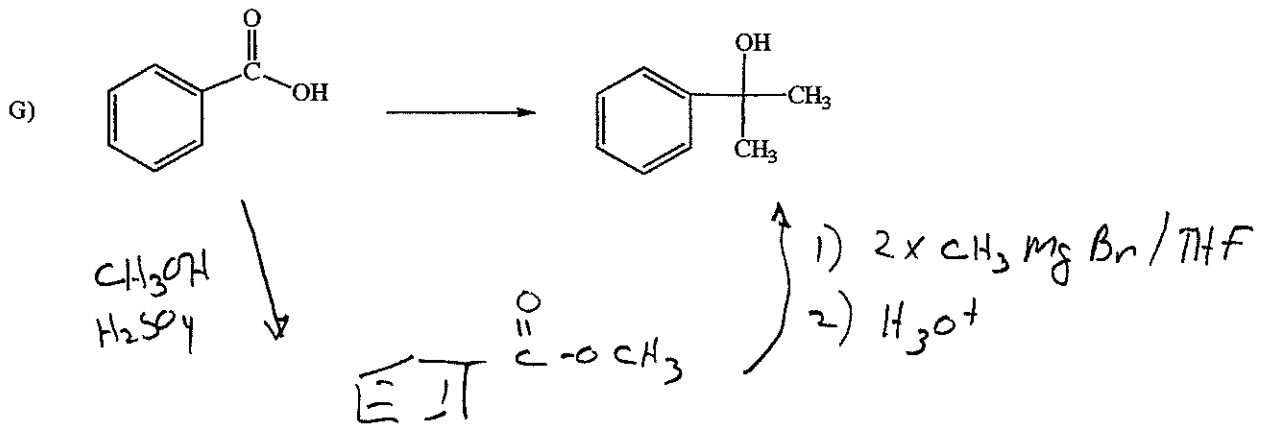
**Problem 1. (21 points)** Give the final products for the following reactions. If no reaction occurs, please state so. Circle your answers.



**Problem 2 (64 points)** Show how you would carry out the following transformations with the given starting materials and any necessary organic or inorganic reagents. You do not need to show the synthesis of the reagents. For each step in the reaction sequence show the product for each reaction.

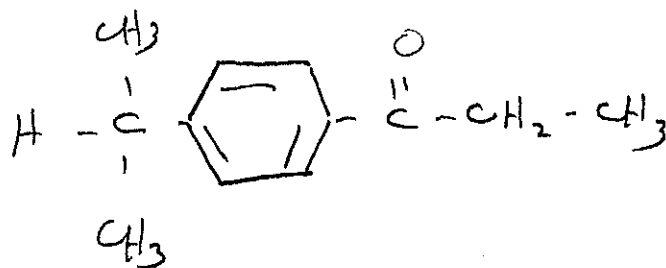






**Problem 3 (15 points)** Determine the structure of the compound that has the molecular formula  $C_{12}H_{16}O$  whose NMR spectrum has the following resonances. **Assign each resonance to the correspond hydrogen in the molecular structure.**

$\delta$  0.9 (doublet, 6H),  $\delta$  1.2 (triplet, 3H),  $\delta$  2.5 (septet, 1H),  $\delta$  2.9 (quartet, 2 H),  $\delta$  7.1 (doublet, 2H) and  $\delta$  8.1 (doublet, 2H)



Chemical Shifts: alkane ( $\delta$  0.9 – 1.8), allylic (H-C-C=C,  $\delta$  1.5-2.6),  
 C-H adjacent to C=O ( $\delta$  2.0-2.9), alkyne ( $\delta$  2.5), benzylic (H-C-Ar,  $\delta$  2.3-2.8),  
 alcohol or ether (H-C-O,  $\delta$  3.3-3.7), Vinylic (H-C=C,  $\delta$  4.5-6.5), aryl (H-Ar,  $\delta$  6.5-8.5),  
 aldehyde (H-C=O,  $\delta$  9-10), alcohol (H-OR,  $\delta$  0.5 – 5.0)