## Long Island University, Department of Chemistry

Chem. 122, Sect 007,

Exam 1, 100 pts, Spring, 2012

1. Identify the following molecules: (a) formula  $(C_3H_7Br)$ ; <sup>1</sup>H NMR:  $\delta$  1.2, doublet, 6H; 1.6, singlet, 1H. (b) formula  $(C_{10}H_{10}O)$ ; IR: 1720 cm<sup>-1</sup>; <sup>1</sup>H NMR:  $\delta$  1.1, doublet, 3H; 1.3, quartet, 1H; 7.4 broad singlet, 5H; 9.6, triplet, 1H. (20 pts)

2. Give the product of the following reactions. It is not necessary to show the full mechanism. (10)

(a) 
$$OCH_3$$
 O OH II I I CH2-CH2-CH2-CH2-OH  $OCH_2$  O OH II II I CH2-CH2-CH2-OH  $OCH_2$  OH  $OCH_2$ 

3. For the following reactions, show all of the intermediates, (30 pts)

(a) 
$$\xrightarrow{Br} \xrightarrow{Mg} A \xrightarrow{CH_3CH_2-C-H} B \xrightarrow{H_3O^+} C$$

(b)  $\xrightarrow{Cl} \xrightarrow{2Li} D \xrightarrow{CuCl} E \xrightarrow{CH_2-C-H} F$ 

(c)  $CH_3CH_2OH \xrightarrow{CH_3MgBr} G \xrightarrow{CH_3CH_2-C \equiv C-CH_2Br} H$ 

4. Give the product(s) of the following reactions and show the complete reaction mechanism in each case. (20 pts)

(a) 
$$CH_3CH_2OH + HOCH_2-CH$$
  $CH_3$   $H_2SO_4$  3 products, all ethers  
(b)  $CH_3$   $CH_3OH$  cyclic ether

5. Synthesize **two** of the following three molecules as shown. For extra credit do all three. (20 pts)