

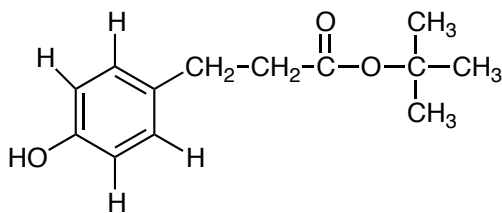
Name

L.I.U.

Chem. 122, Sect 009,

Quiz 1, 50 pts, Spring, 2012

1. For the following molecules identify (a) the number of carbon signals (b) the number of proton signals (c) the spin-spin splittings or multiplicities of the proton signals and (d) the relative intensities of the proton signals. (10 pts)



3. In the molecule above there are several functional groups that give characteristic absorbance peaks in the infrared spectrum. Identify **three** of them and give the expected position of the absorbance peak in cm^{-1} . (6 pts)

2. Identify the following molecule of formula $\text{C}_6\text{H}_9\text{BrO}$; IR: 1720 cm^{-1} ; ^1H : δ 1.8, singlet, 3H; 2.3, singlet, 3H; 3.4, doublet, 2H, 5.6, triplet, 1H. (14 pts)

3. In the preparation of acetyl salicylic acid (aspirin) from salicylic acid, acetic anhydride and phosphoric acid (a) would water be a good recrystallization solvent for the aspirin? (b) One student transferred all her solid aspirin product to a large test tube and to save time she added 25 mL of 50:50 ethyl acetate/hexane all at once. She heated the test tube in a hot water bath. All the solid disappeared. But afterward when she cooled the test tube down in the ice bath she did not get any crystals. The teaching assistant told her to reduce the volume so she removed half of the solution with a pipette. She then cooled the test tube down again in the ice bath. She still did not get crystals. What should she do? Was her experiment ruined? How could she recover her pure aspirin?

4. In the preparation of triphenyl carbinol from bromobenzene, magnesium and methyl benzoate (a) What is the purpose of the flame drying? (b) Why should you first remove the stopcock from separatory funnel/addition funnel before flame drying? (c) How can you tell when you have formed your organomagnesium reagent? (d) In one lab section, the stockroom ran out of methyl benzoate ($\text{C}_6\text{H}_5\text{CO}_2\text{CH}_3$) and so the teaching assistant told the student to use benzoic acid ($\text{C}_6\text{H}_5\text{CO}_2\text{H}$) instead. Would the reaction still work? Explain briefly and show any reaction that would occur between the phenyl magnesium bromide and the benzoic acid.