HOMEWORK ASSIGNMENT #7 ORGANIC CHEMISTRY I (20 pts)

**(due Monday 22 Oct 2012)**

your name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7.1 Making RX (5 pts)**

Given the hints below, write a specific example of the reaction implied by the hint(s):

1. Old school substitution, low yield, reflux (it’s part of synthetic `boot camp’)….



1. Double bond left alone; radicals and light needed (allylic thingie)

 NBS = N-bromosuccinimide a commercial bromination



 reagent

1. Pyridine or aq KHCO3 the key

 modern halogenation (liquid phase)

1. Markovnikoff addition to RX



1. Two functionalities added; Br2 in CCL4 (wet)

 halohydrin formation

7.2  **Boxes, Little Boxes (1 pt/box/ 11 pts total)**

Fill in the boxes with the correct substrate, reagent, conditions and/or products

a)





+ KOH/ethanol + H2O + Br-

 b)



 NaOH + 3-methyl-2-octanol



 c) Freon solvent



 +

  +



d) CH3CH2-Br +



e) CH3 CH2 Br + H2S neat + HBr

 {H+(HS-)} CH3CH2SH





f) + NH2CH3

**7.3 Making RX (5 pts) REPETITION IS THE KEY TO LEARNING ORGANIC CHEM !**

Given the hints below, write a specific example of the reaction implied by the hint(s):

1. Old school substitution, low yield, reflux (it’s part of synthetic `boot camp’)….



1. Double bond left alone; radicals and light needed (allylic thingie)

 NBS = N-bromosuccinimide a commercial bromination source



1. Pyridine or aq KHCO3 the key

 modern halogenation (liquid phase)

1. Markovnikoff addition to RX



1. Two functionalities added; Br2 in CCL4 (wet)

 halohydrin formation

**7.4. SN2 and SN 1 vs the facts (4 pts)**

1. Briefly explain how the SN2 mechanism rationalizes the reactivity order : I- > Br- > Cl- > F-

*The less strongly held the negative charge, the more reactive it is. The order of electronegativity is F > Cl > Br> I which means I holds onto electrons least making it most reactive*

1. Briefly explain how the SN2 mechanism rationalizes the observation that non-polar solvents speed up an SN2 reaction.

*Two basic effects: 1) weakly polar (non-polar), non-protic solvents look like 5-coordinated complex and so stabilizes this rate limiting complex 2) weakly polar, non-protic solvents solvate nucleophiles well*

1. Briefly explain how the SN1 mechanism rationalizes the observation that polar, protic solvents

(e.g those with :O-H ) speed up SN1 reaction

*Protic (O bearing) solvents stabilize carbocation with lone pairs on O, making reaction more kinetically favorable*

1. What feature of the R (alkyl) groups explains why higher degree alcohols prefer an SN1 path over an SN2 path ? inductive effect…*R groups donate electrons to carbocation and stabilize it*