HOMEWORK ASSIGNMENT #7 ORGANIC CHEMISTRY I (25 pts)

**Due 29 October Wednesday 2014**

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

**7.1 RX hints (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’)



*Classic SN2 acid-catalyzed substitution*

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



*Allylic substitution with NBS*

*(N-bromosuccinimide, a commericial*

*brominating reagent)*

1. Pyridine or aq KHCO3 the key



*modern, solution phase halogenation: fast, efficient,*

 *no rearrangements*

1. Markovnikoff addition to RX



*addition reaction across alkenes*

1. Two functionalities added; Br2 in CCl4 (wet)



*halohydrin formation; OH adds markovnikoff*

**7.2 Synthetic pathways using RX (8 pts total/2 pts each)**

Starting from any alkyl halide, suggest a route to the compounds on the right:



via dehydrohalogenation



a)





b)

via

SN1 substitution



c)





d)

via

SN1 substitution



via

SN1 substitution

**7.3. Synthetic pathways starting with alcohols (6 pts total/ 3 pts each)**

Starting from any <4-carbon alcohol(s), (and if necessary, a <4 carbonyl compound(s)) suggest routes to:



**larger alkanes via Corey-House**





octane

**larger alcohols via Grignard**



2,3-dimethyl-2-butanol

 b)





**7.4 Mechanistic Fact Checking** (6 pts)

a)What common initial reaction is shared by the Sn1 and Sn2 reaction: ROH +X- 🡪RX ?

**ROH +H+ 🡪 ROH2+ protonation of the alcohol**

b)Which mechanism features rearrangements and carbocations? \_\_\_\_\_\_\_SN1\_\_\_\_\_\_\_

c)t-butanol is most likely to react with HBr via which mechanism, Sn1 or Sn2 ?\_\_SN1\_\_\_\_\_

d)Which substrate 0o,1o,2o or 3o exhibits the fastest reaction via Sn2 ? \_\_\_\_0o\_\_\_\_\_\_\_\_

e)I like soft, fuzzy, non-O bearing solvents, am moved by both substrate and nucleophile concentrations and am into weird 5-coordinated transition states. I am the \_\_SN2\_\_\_\_\_ mechanism

f) Will 1-butanol rearrange during bromination ? YES **NO**