**exercise #13 Mechanistic Predictions for Substitutions to Alkyl Halides**

**Organic Chem I Alfred State College**

**1). Rate Predictions part I (substrate effects)**

*Which will react faster with HBr/ aqueous w/reflux....*

a) t-butanol or sec-butanol **or ~ same**

b)



**or ~same**

c)



**or ~same**

d)



**or ~ same**

**2) Rate Predictions part II (effect of reagents & concentrations)**

*which will run faster ? (answer can be “neither”)*

**H2SO4/reflux**

**a)***t-butanol + NaBr-----------> t-butyl bromide or...*

**H2SO4/reflux**

*t-butanol + NaF -----------> t-butyl fluoride*

*aqueous/reflux*

***b)*** *1-butanol + HBr 1-chlorobutane*

*neat/reflux*

*1-butanol + HBr 1-chlorobutane*

*reflux*

**c)** *2-butanol + 1M HCl----------> 2-bromobutane*

*reflux*

*2-butanol + 10M HCl --------> 2-bromobutane*

**3) Rate Predictions III (effect of solvents and neighbors)**

*Which will run faster ?*

1. *2-butanol + NaBr in diglyme (an ether) or*

*2-butanol + NaBr in CH2Cl2*

1. *1-butanol + HF in glacial acetic acid (protonic, O-bearing solvent) or*

*1-butanol + HF in CH3Cl*

1. *1-butanol + HCl or*

*2,2-dimethyl-1-butanol +HCl*

**4) Rearrangement predictions**

What is(are) the likely product(s) that form for each reaction below ?



