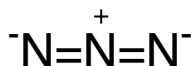
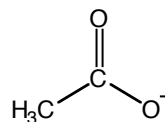
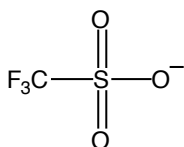
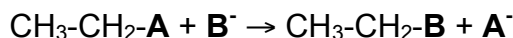


Chemistry 211 – Problem Set VI – Due November 17th at 5:00 PM

1) (20 points) From the following six species:



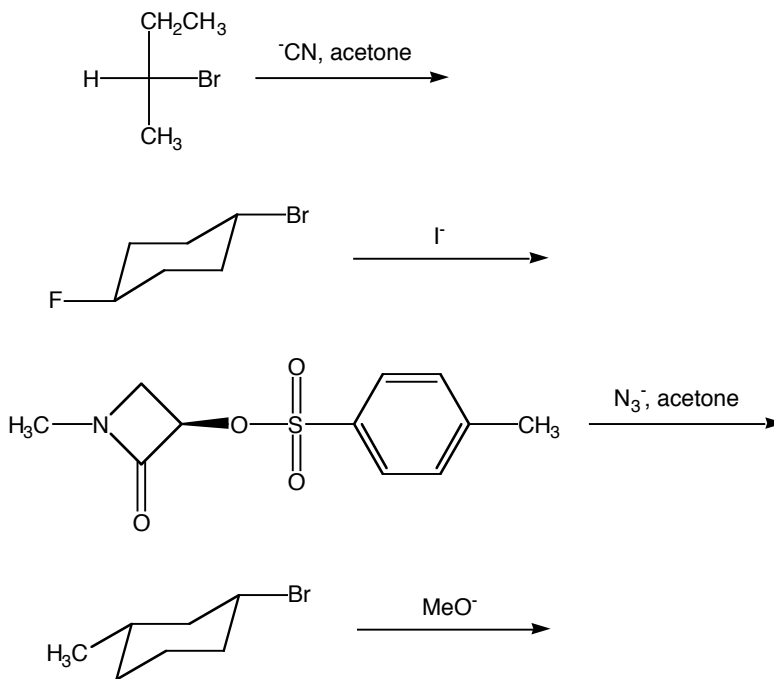
- a) Select the best three nucleophiles and the best three leaving groups. Organize them for best to worst within each subgroup of three (i.e., take the three nucleophiles you picked and order them from best to worst, and do the same for the leaving groups). In all cases, write a short sentence explaining your answer.
- b) Considering your answer from (a), what should **A** and **B** be in the following reaction for it to proceed the fastest? And for the reaction to go really slow to the point it does not work?



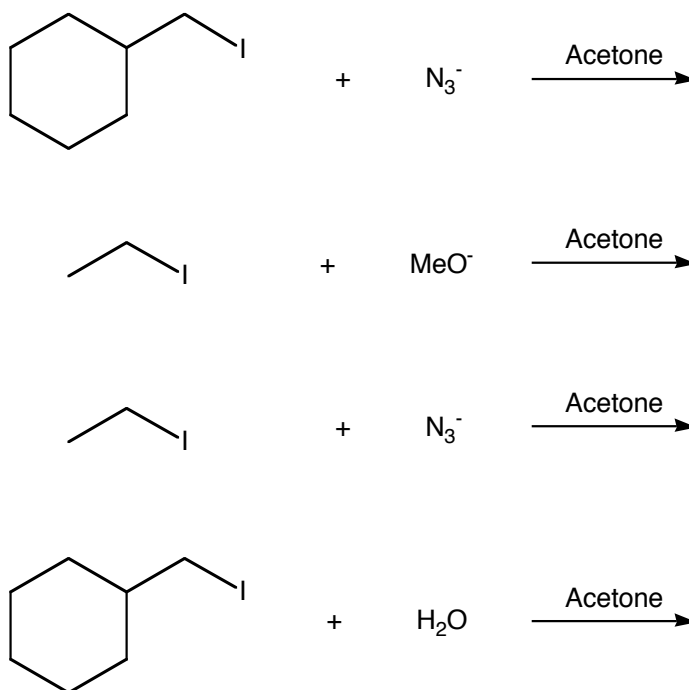
2) (20 points) Draw the following compounds using bond-line representation and wedged/dashed bonds *ONLY* (i.e., no Fischer projections or condensed structures, please...).

- (2*R*,3*S*)-3-ethyl-2-iodohexane
- cis*-1-(2-bromoethyl)-2-(chloromethyl)-cyclopentane
- trans*-1-(2-methylpropyl)-2-(trichloromethyl)cyclooctane
- (2*S*,4*S*)-3,3-dibromo-2-chloro-4-[(2*R*)-2-fluoropropyl]nonane

3) (20 points) For the following bimolecular reactions, predict the products and write a detailed mechanism for their formation (i.e., push electrons...). For substrates/products with chiral centers, determine the chirality before and after the reaction. For products that can exist in different conformations, make sure that you draw the most stable ones.

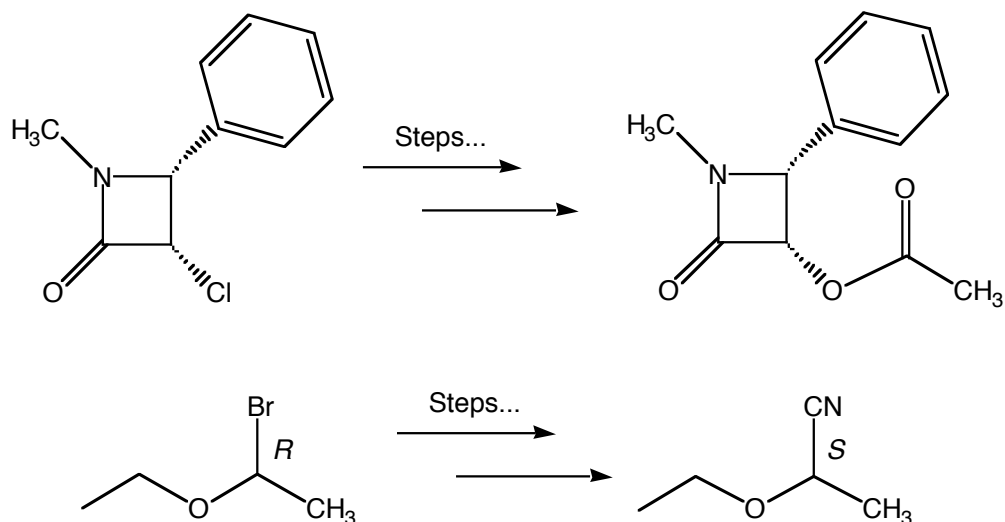


4) (20 points) Consider the following reactions:



Remembering all the factors that affect the rate of bimolecular (S_N2) reactions, order them from fastest to slowest. Explain your reasoning.

5) (20 points) From the list below, choose the best solvent and salts to perform each of the transformations shown:



You have the following stuff in your lab:

Solvents: water, methanol, and acetone.

Salts: sodium chloride, bromide, and iodide (NaCl , NaBr , NaI), sodium acetate (NaOCOCH_3), and potassium cyanate (KCN).

Make sure that you achieve the stereochemistry specified in each case, and write the detailed mechanism for each transformation. Note that more than one reaction may be required to do some of them.

6) (20 points) Two substitution reactions of (*S*)-3-bromohexane under different conditions are shown below. Predict the product(s) and stereochemical outcome of each reaction, providing a reasonable explanation in each case.

