**Special Topics in Fine Chemicals 2008 2nd Exam Student ID # Name**

*Total 100 points. Write your answers in the space provided. If you need more space, write on the back.*

1. (a) (10 points) A reaction solvent has often a dramatic effect on the reaction results as shown by the following nucleophilicity order of halides in different solvents: I- > Br- > Cl- in MeOH vs I- < Br- < Cl- in DMF. Explain the above apparently opposite results.

(b) (6 points) Suggest two additives to improve the reaction yield or rate in the following reactions. Explain how they help to accelerate the reaction.

2. (10 points) Write down the stepwise mechanism for the following reaction.



3. (6 x 4 points) Provide suitable deprotection conditions for each of the following protecting groups of amines and show stepwise how the cleavage occurs.













4. (2 x 10 points) Provide necessary reagents and reaction conditions to produce each diastereomer in the following reactions. It may require more than one step of the reaction and explain your answer.





4. (6 x 5 points) Show the structure of the major products for each of the following reactions. Please pay attention to the stereochemical results where appropriate.











