Problem Set 1

Due Date: April 22nd 2011

Provide reasonable mechanisms for the following transformations. (5 points each)

1. \( \text{EtO}_2\text{C} \xrightarrow{\text{DBU, THF}} \text{CO}_2\text{Et} \)

2. \( \text{N}_2\text{CO}_2\text{Me} + \text{Ph} \xrightarrow{\text{Rh}_2(\text{OAc})_4, \text{toluene, 60 °C to reflux}} \text{Me} \xrightarrow{\text{DDQ}} \text{Ph} \)

3. \( \text{O}_2\text{N} \xrightarrow{1. \text{AgOTf, MeCN, 70 °C}} \text{O}_2\text{N} \xrightarrow{2. \text{BnMe}_3\text{NCN, MeCN, rt}} \)

4. \( \text{O}_2\text{N} \xrightarrow{\text{NH}_3} \text{O}_2\text{N} \)

5. \( \text{Me-SO} \xrightarrow{\text{TsoH, THF}} \)

6. \( \text{MeO} \xrightarrow{\text{DDQ, wet MeCN, reflux}} \)

7. \( \text{NC} \xrightarrow{\text{cat DBU, xylenes, reflux}} \)

8. \( \text{CN} \xrightarrow{\text{PCI}_5 (2 \text{eq.})} \)

9. \( \text{R} \xrightarrow{1. \text{PCI}_5} \text{BnO} \xrightarrow{2. \text{KOTBu}} \)

10. During class, the possibility of a pyrimidine variant of Zincke's salt was brought up. Thinking mechanistically, comment on whether this reaction will or will not work. (This is an open-ended question, but you will need to provide your thoughts on the possible intermediates that could be formed.)
Problem Set 1

Provide simple syntheses for the following compounds. (10 points each)
(You may use only ONE cross-coupling reaction (Pd or similar metals) throughout the ten syntheses in this section, so please use it wisely.)

(A)

(B)

(C)

(D)

(E)

(F)

(G)

(H)

(I)

(J)