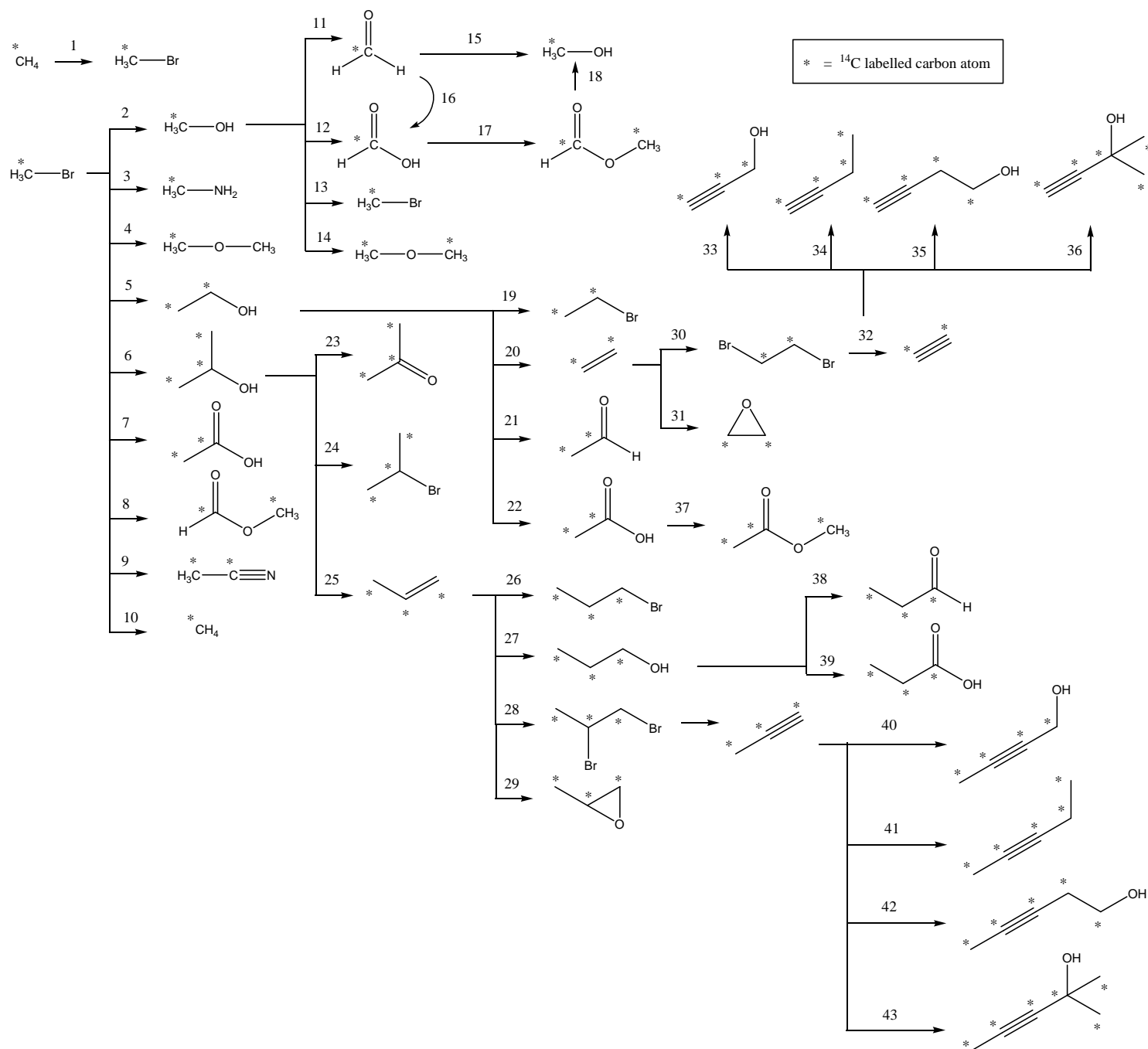


Reactions Worksheet 1

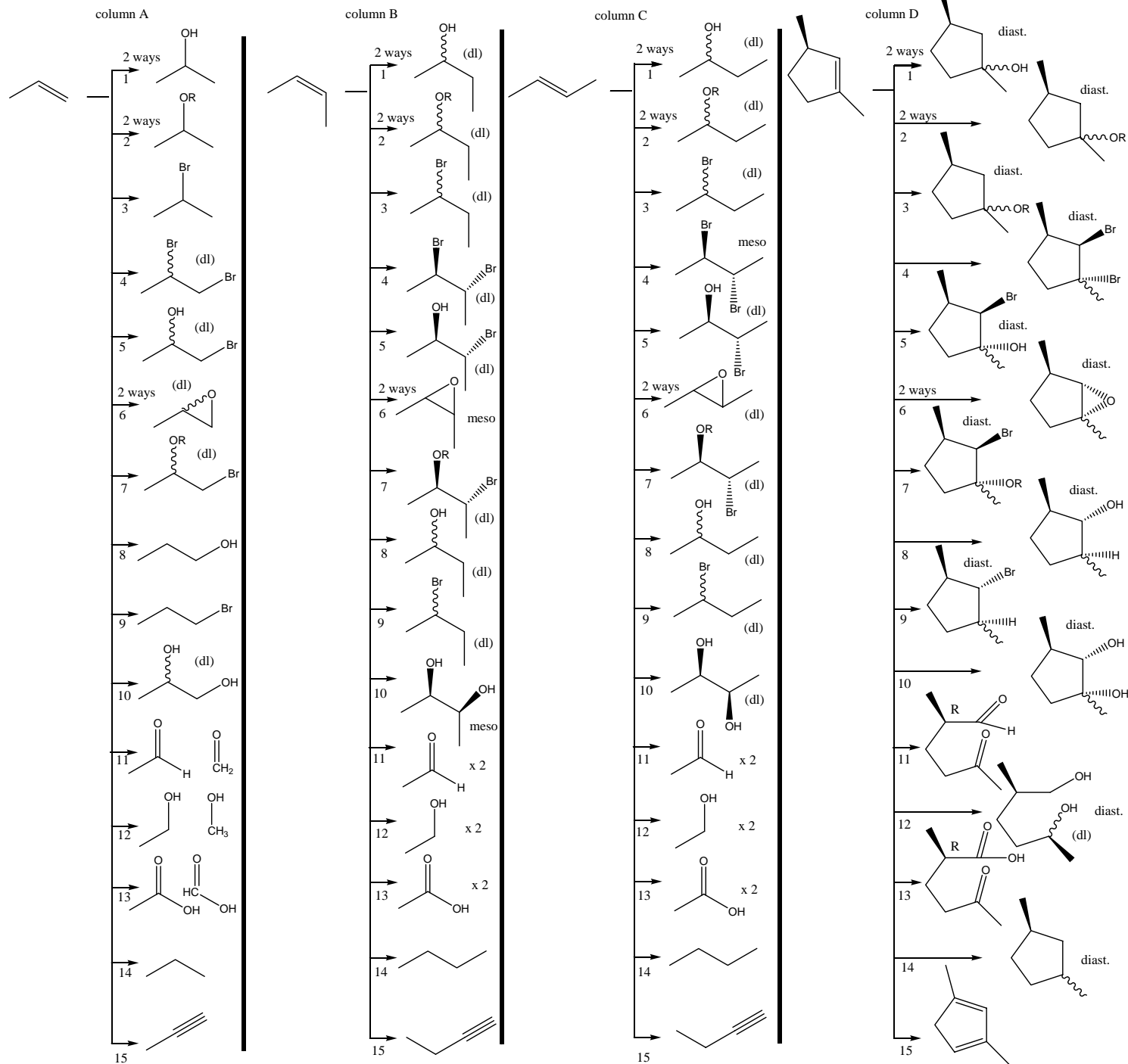
Supply acceptable reagents for each synthetic step. Each worksheet will have its own key. The keys are based on the list of functional groups (by number) and their reactions (by letter) that follow the reactions worksheets. Self grade yourself with 10 = 0-4 errors, 9 = 5-8 errors and 8 = 9 or more errors. Turn in your “self-grade” score on a sheet of paper with your name in the assigned lecture. Worksheets and answers are available on my “Courses” web page at: <http://www.csupomona.edu/~psbeauchamp/courses.html>



Reactions Worksheet 2

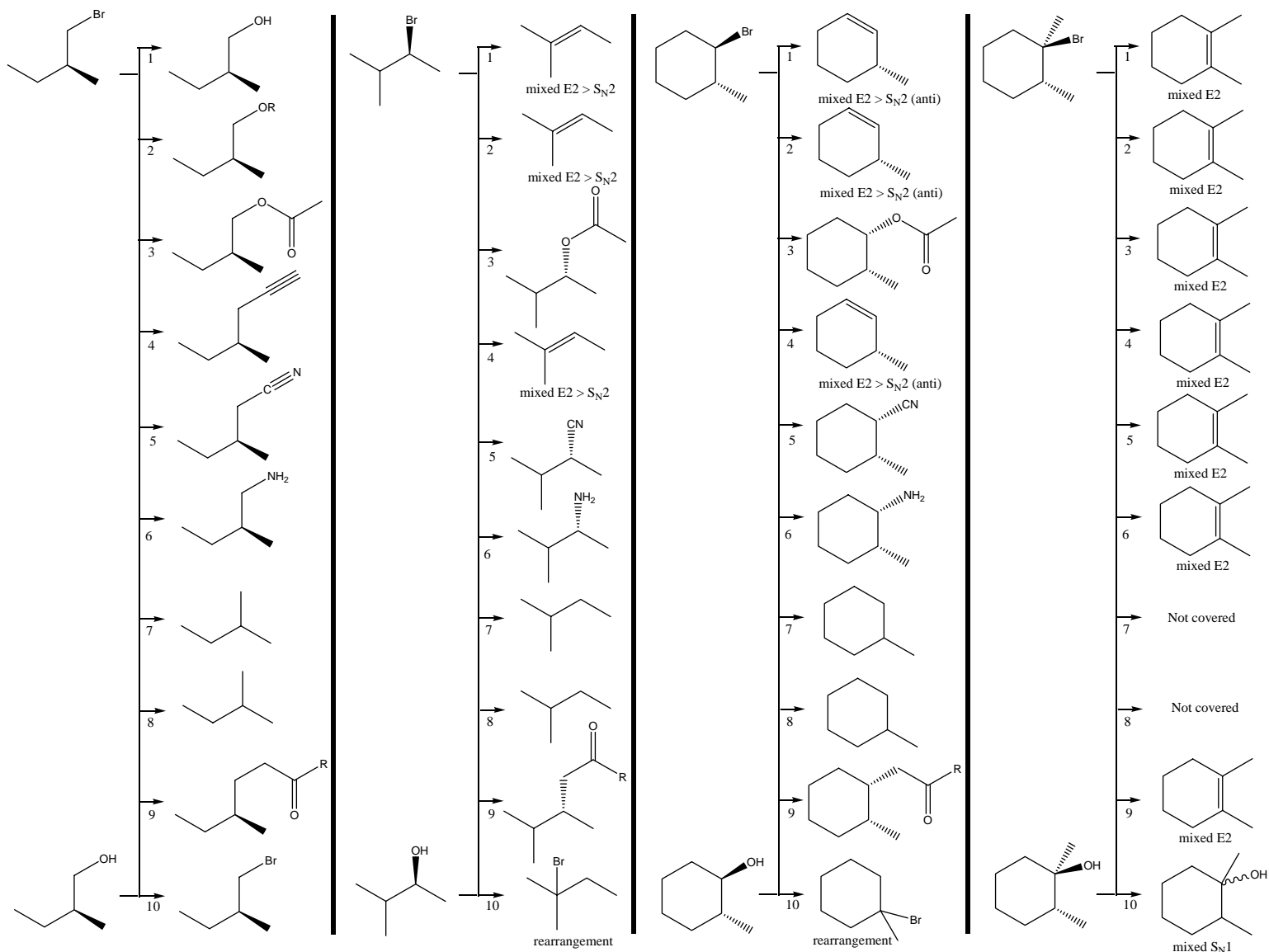
Supply acceptable reagents for each synthetic step. Each worksheet will have its own key. The keys are based on the list of functional groups (by number) and their reactions (by letter) that follow the reactions worksheets. Self grade yourself with 10 = 0-4 errors, 9 = 5-8 errors and 8 = 9 or more errors. Turn in your “self-grade” score on a sheet of paper with your name in the assigned lecture. Worksheets and answers are available on my “Courses” web page at: <http://www.csupomona.edu/~psbeauchamp/courses.html>

~~~~~ a squiggly line indicates mixed stereochemistry (both R and S configurations at that center)



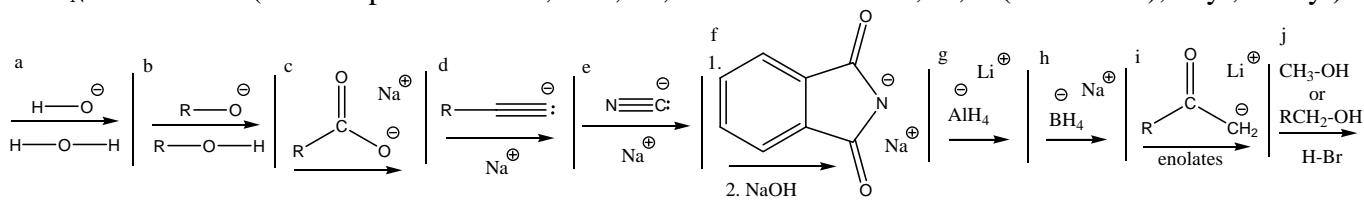
**Reactions Worksheet 3** – S<sub>N</sub>2/E2 conditions

Supply acceptable reagents for each synthetic step. Each worksheet will have its own key. The keys are based on the list of functional groups (by number) and their reactions (by letter) that follow the reactions worksheets. Self grade yourself with 10 = 0-4 errors, 9 = 5-8 errors and 8 = 9 or more errors. Turn in your “self-grade” score on a sheet of paper with your name in the assigned lecture. Worksheets and answers are available on my “Courses” web page at: <http://www.csupomona.edu/~psbeauchamp/courses.html>



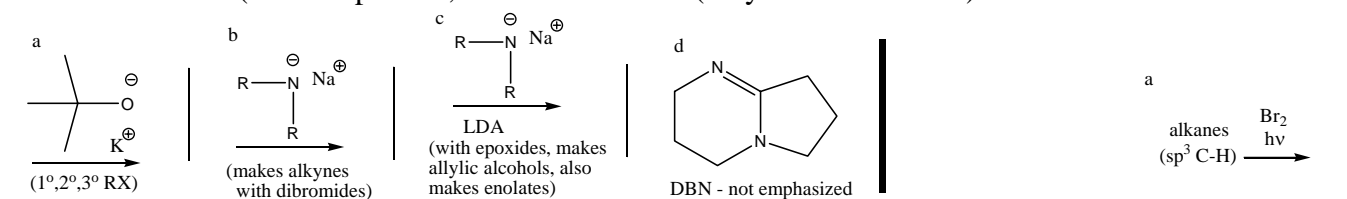
**Functional Group Reaction Summaries** – Usually interpret the following by: 1. using a starting material similar to the section title, 2. Using the given reaction conditions and 3. Predicting possible product(s). Sometimes the correct answer is “No Reaction = NR”.

1. S<sub>N</sub>2 conditions (RX compounds – RCl, RBr, RI, ROTs and R = Me, 1<sup>o</sup>, 2<sup>o</sup>(sometimes), allyl, benzyl)



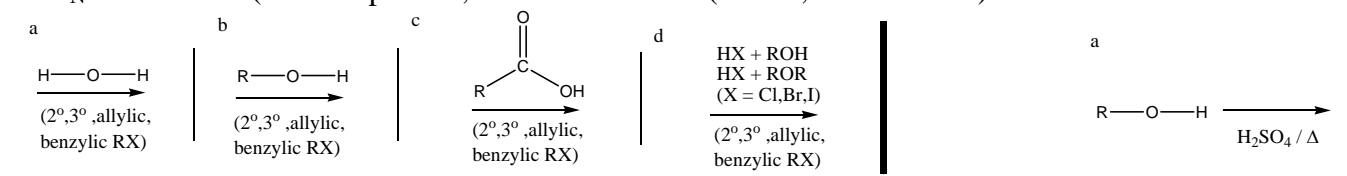
2. E2 conditions (RX compounds, R = 3<sup>o</sup> > 2<sup>o</sup> >> 1<sup>o</sup> (only with t-butoxide)

3. Alkane reaction

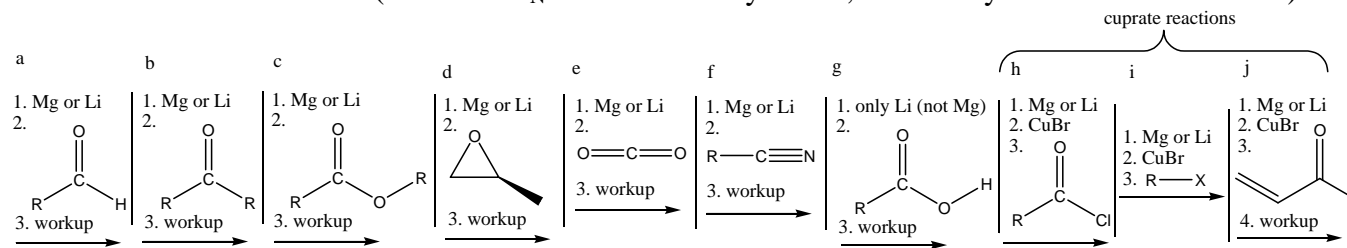


4. S<sub>N</sub>1 conditions (RX compounds, R = 3<sup>o</sup> > 2<sup>o</sup> >> 1<sup>o</sup> (no Me, 1<sup>o</sup> RX for us)

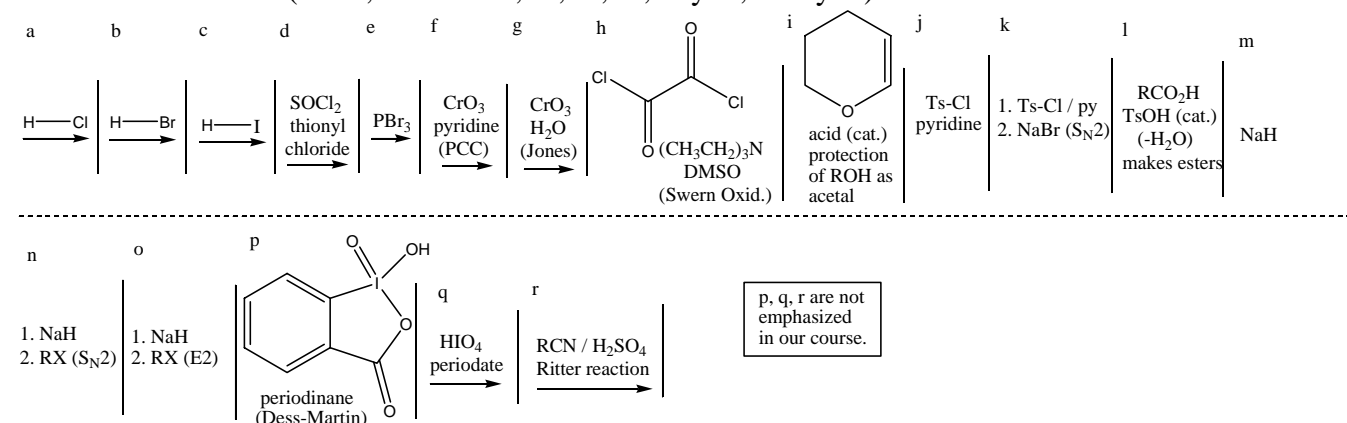
5. E1 conditions



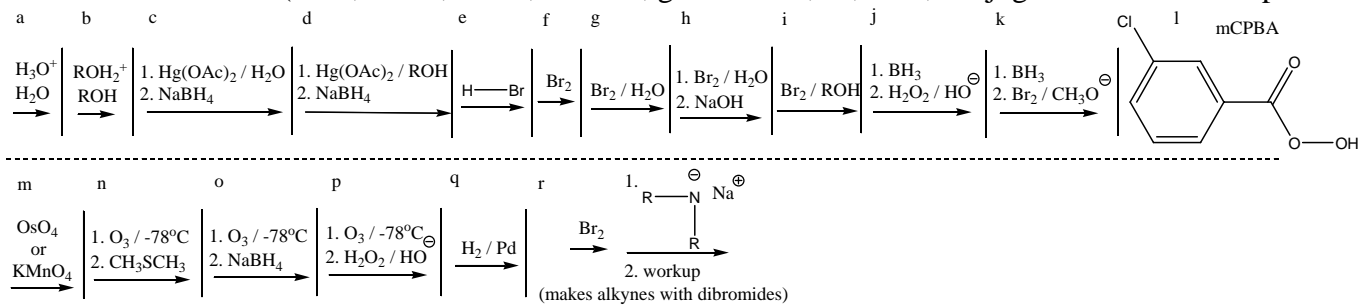
6. Additional RX reactions (See other S<sub>N</sub> and E chemistry above, we usually use RBr in our course)



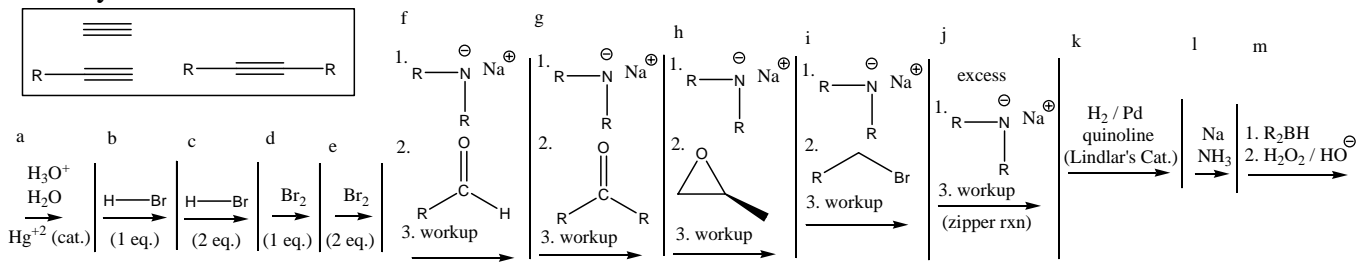
7. Alcohol reactions (ROH, can be Me, 1<sup>o</sup>, 2<sup>o</sup>, 3<sup>o</sup>, allylic, benzylic)



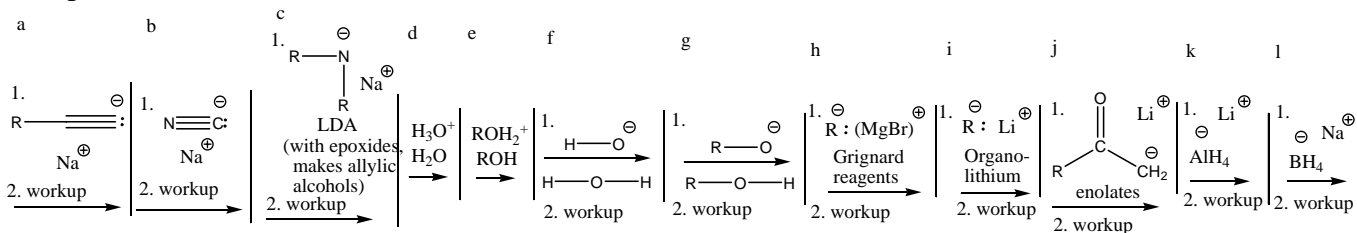
8. Alkene reactions (C=C, mono, cis-di, trans-di, geminal-di, tri, tetra, conjugated" substitution patterns)



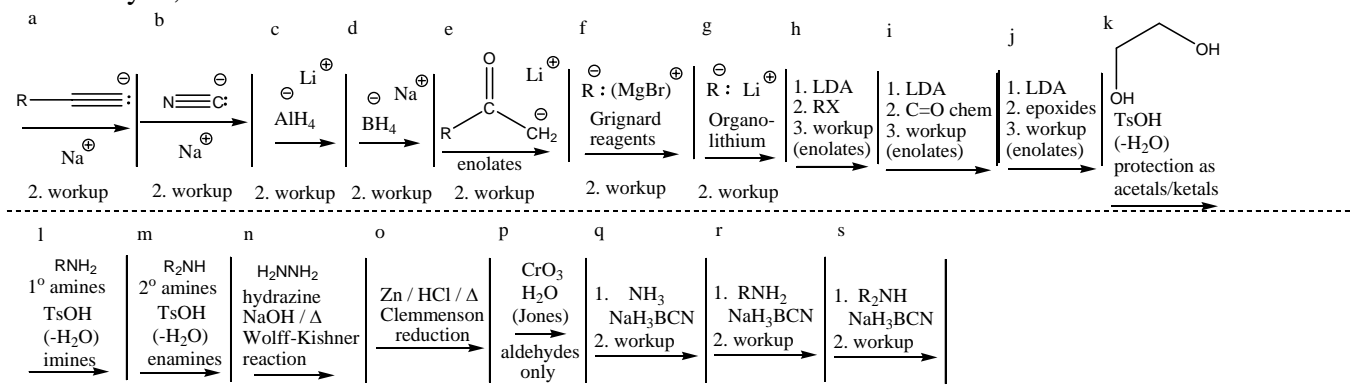
9. Alkyne reactions



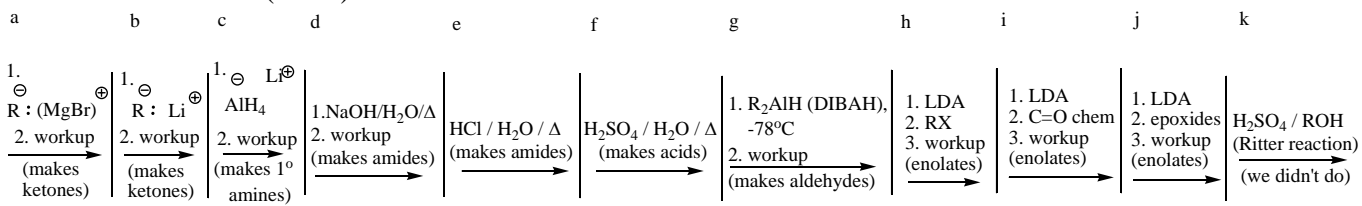
10. Epoxide reactions



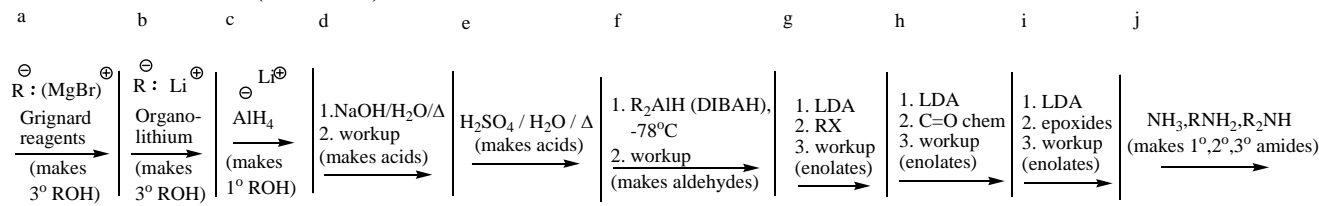
11. Aldehyde, Ketone reactions



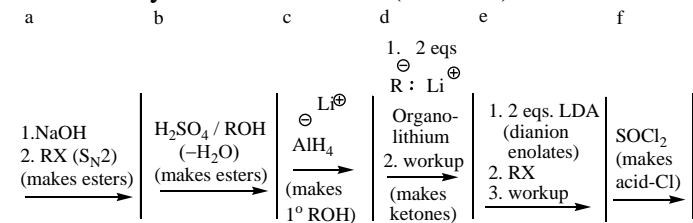
12. Nitrile reactions (RCN)



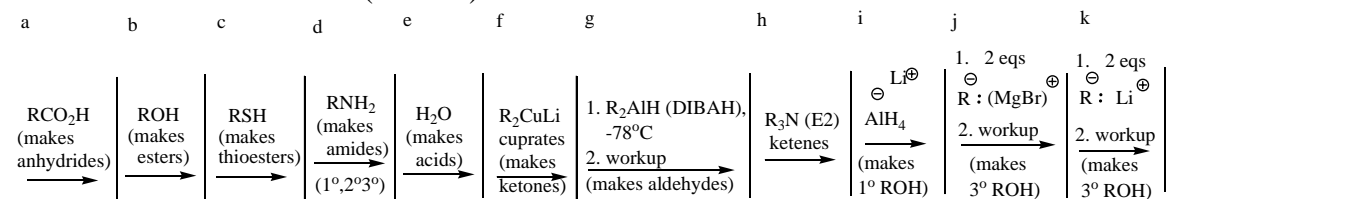
### 13. Ester reactions (RCO<sub>2</sub>R')



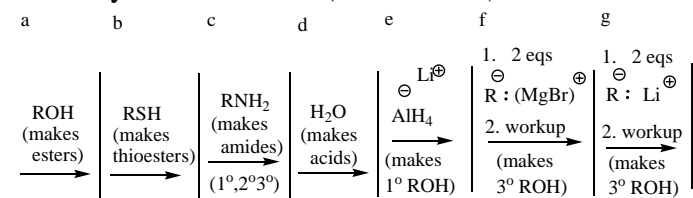
### 14. Carboxylic acid reactions (RCO<sub>2</sub>H)



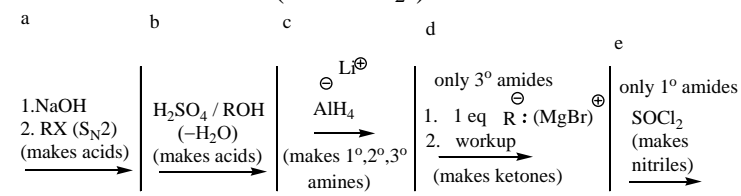
### 15. Acid chloride reactions (RCOCl)



### 16. Anhydride reactions (RCO<sub>2</sub>COR')



### 17. Amide reactions (RCONR<sub>2</sub>)



### 18. Enolates, Dicarbonyl and Dianion reactions

### 19. Aromatic reactions (Ar-H)

**Possible Answers** (These were created quickly. If you think there are errors, you may be correct. Ask me. The first arrow is the number associated with the arrow in the worksheet. In parentheses are listed a number for the functional group section (above), and a letter for the reaction conditions in that section.

### **Worksheet 1**

1(3a) 2(1a) 3(1f) 4(1b) 5(6a) 6(6a) 7(6e) 8(1c) 9(1e) 10(1g or 1h) 11(7f) 12(7g) 13(1j) 14(7o)  
15(11c or d), 16(11p) 17(14a of 1c) 18(13c) 19(1j) 20(5a) 21(7f) 22(7g) 23(7f or g) 24(4d) 25(5a)  
26(8k) 27(8j) 28(8f), 29(8l or h) 30(8f) 31(8l or h) 32(2b) 33(9f) 34(9i) 35(9h) 36(9g) 37(14a)  
38(7f) 39(7g) 40(9f) 41(9i) 42(9h) 43(9g)

### **Worksheet 2**

1(8a and 8c) 2(8b and 8d) 3(8e) 4(8f) 5(8g) 6(8h and 8l) 7(8i) 8(8j) 9(8k) 10(8m) 11(8n) 12(8m)  
13(8o) 14(8q) 15(8r)

### **Worksheet 3**

1(1a) 2(1b) 3(1c) 4(1d) 5(1e) 6(1f) 7(1g or h) 8(1g or h) 9(1i) 10(1j)