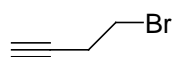


Chemistry 3331
 Organic 2
 Professor Eaton
 Spring 2013

EXAM 1

1. (2 pts) Draw the structure of 3-hexyne

2. (3 pts) For the alkyne structure drawn below provide the IUPAC name

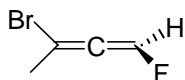


3. (3 pts) Draw the structure of *E*-1,3-pentadiene

4. (3 pts) For the conjugated molecule drawn below provide the IUPAC name



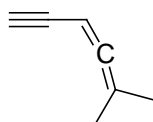
5. (3 pts) Name the allene drawn below including stereochemical designation according to IUPAC



6. (2 pts) When naming an organic molecule by the IUPAC rules you:

- use atomic number to determine priority
- use functional group significant to determine priority
- use mass to determine priority
- a and c

7. (3 pts) For the ene-yne drawn below, label the carbons as to their hybridization (sp, sp², sp³). Is this molecule an example of a conjugated pi-system?



8. (5 pts) Draw the MO diagram of butadiene and show the phases as they change from lowest to highest energy orbital. Label the HOMO and LUMO in your drawing.

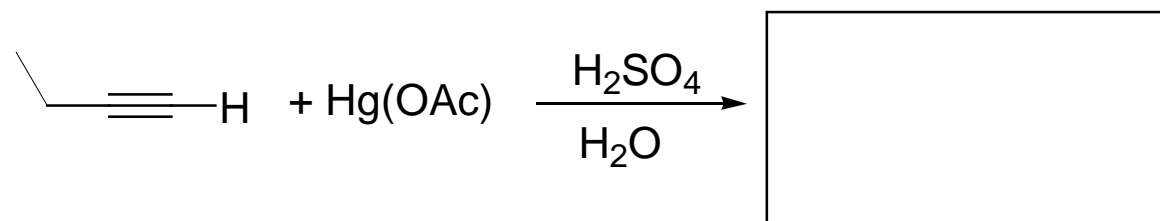
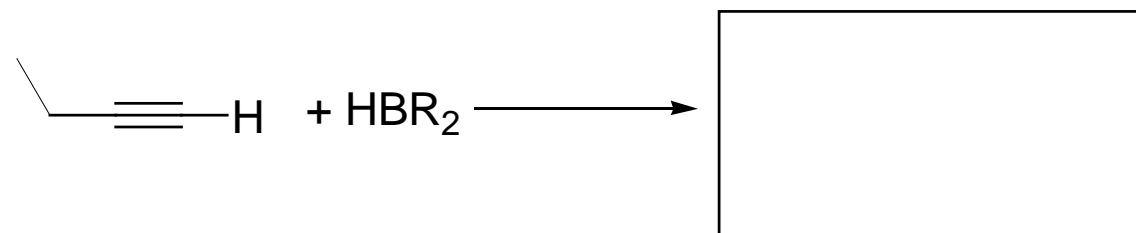
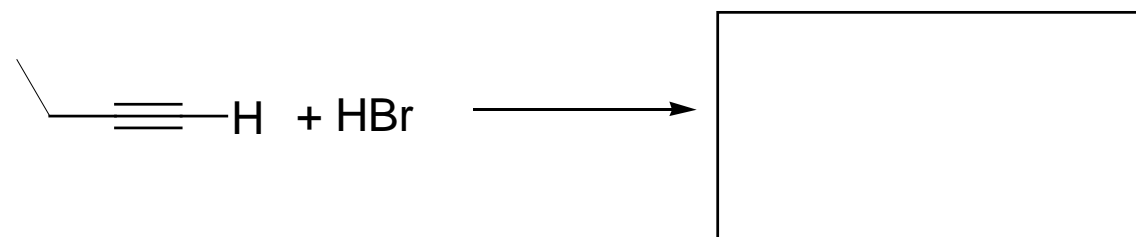
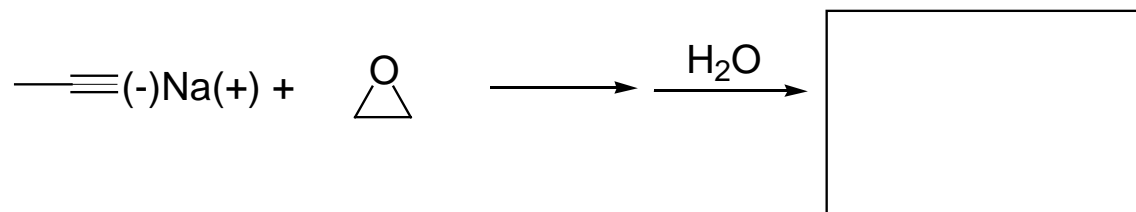
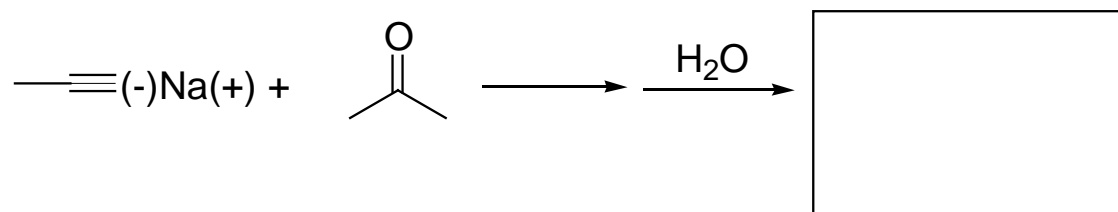
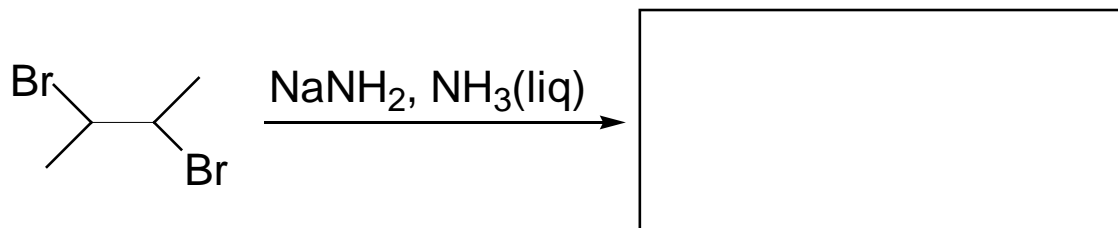
9. (3 points) For benzene the structure is comprised of:

- a) alternating single and double bonds
- b) a combination of sp and sp² hybridization at carbon
- c) all carbons being sp² hybridized
- d) all carbon-carbon bond lengths being the same
- e) a and b
- f) c and d

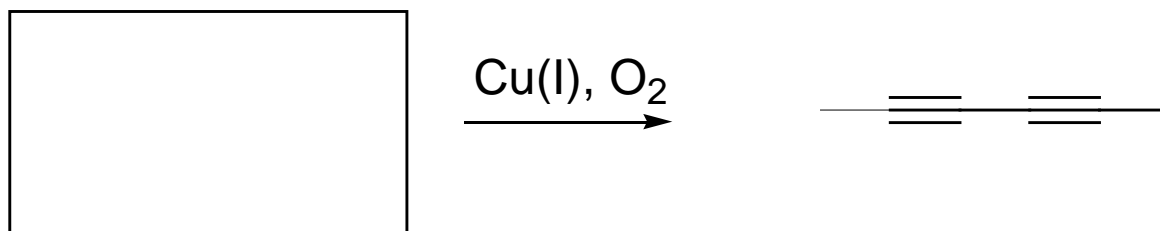
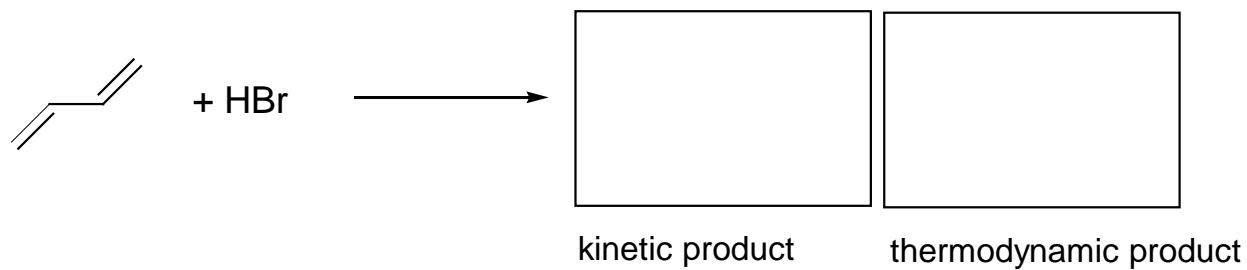
10. (2 points) In general, aromatic pi-systems can be especially stable because:

- a) more hypersonic resonance localization
- b) inductive stimulation of the sigma system
- c) they have fewer nodal planes in the pi-system compared to their linear counterparts
- d) degenerate energy in the HOMO orbital

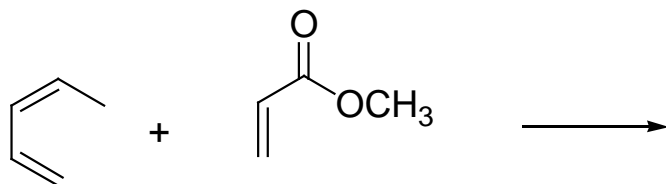
11. (48 pts) For the reactions shown below, fill in the box to complete the chemical equation



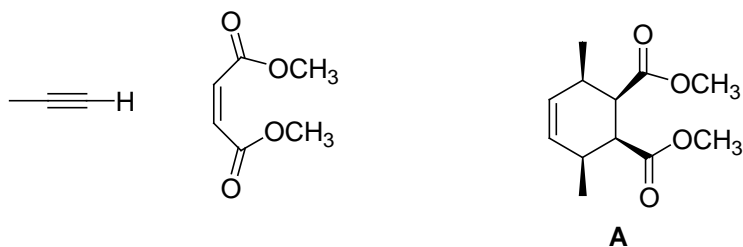
11. Continued



12. (8 points) For the Diels-Alder reaction drawn below, please draw all products from the reaction clearly indicating stereochemistry. Assume NO regio-control of this reaction. If possible, label the products as coming from an endo or exo transition-state. If not possible to label as coming from an endo or exo transition-state, label the molecule as ambiguous with regard to the transition-state.



13. (10 points) Using only the organic molecules shown below but any other reagents you need, draw a synthetic scheme for the preparation of the cyclohexene labeled as A below. Note it is fine if your synthesis gives a mixture of stereo isomers of A.



14. (5 points) Explain why A of question 13 would be a major or minor product of the reaction scheme you proposed.