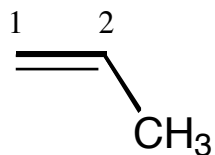
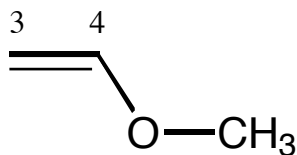


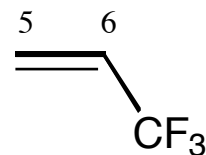
1. Answer the following questions concerning the three alkenes shown below. Your answer should use words and illustrations.



A



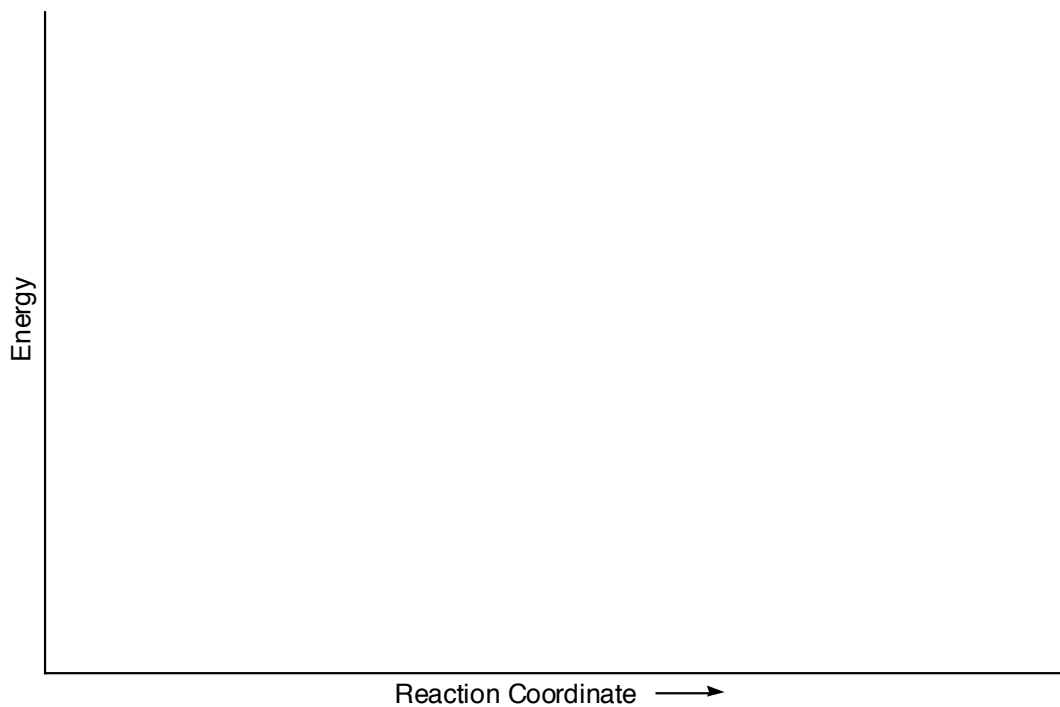
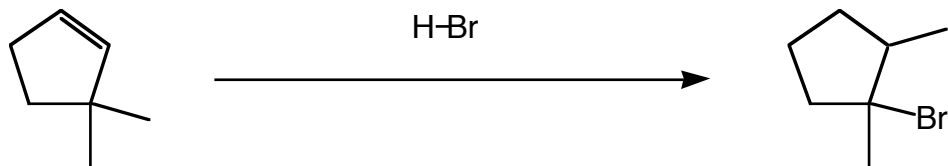
B



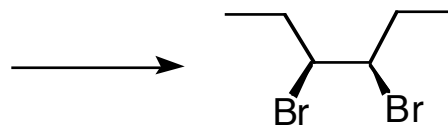
C

- a) Which alkene would be *most* reactive with H<sup>+</sup>? Why?
- b) Which alkene would be *least* reactive with H<sup>+</sup>? Why?
- c) Which alkene would be most reactive under conditions of catalytic hydrogenation? Why?
- d) Will all three alkenes undergo Markovnikov addition of HBr? If not, which alkene or alkenes won't and why?

2. Provide a mechanism for the following reaction. Then, predict the reaction energy diagram for the entire reaction in the space provided. In your diagram, you must indicate the  $\Delta H$  of the reaction, label the activation energy ( $E_a$ ) of the rate-determining step, and clearly identify all intermediates and products of the reaction.



3. What starting materials & reagents are needed to produce the following compound?



4. Draw the **major product** of each of the following reactions. *Be sure to include stereochemistry in your answers where appropriate.*

