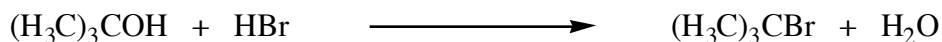


## Chemistry 333R

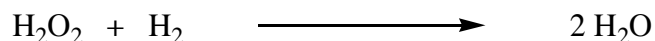
### Week 5 Group Questions

1. Use bond dissociation enthalpy values in Table 4-2 (page 136 of Wade, *Organic Chemistry*, 6th edition) to calculate the standard heats of reaction for the following reactions.

a.



b.



2. Draw a labeled reaction-energy diagram (graph of potential energy versus reaction coordinate) for a three-step exothermic reaction with the:

- first step being the rate-determining step
- second step being the rate-determining step
- third step being the rate-determining step

3. Draw a labeled reaction-energy diagram for a two-step reaction with an early first transition state and a late second transition state. State whether the transition states resemble the starting material, intermediate or product. Repeat the exercise for a two-step reaction with a late first transition state and an early second transition state.

4. Explain concisely why a tertiary alkyl radical is more stable than a primary alkyl radical.

5. The photochemical reaction of 2,4-dimethylpentane with molecular chlorine affords a mixture of monochlorinated alkyl halides. Draw the structures of these products and predict the molar ratio when the reaction is run at 25° C. (Note: For these conditions, the relative rates of hydrogen atom abstraction are 5.5:4.5:1.0 for 3°:2°:1° alkane carbons.)

Please bring your set of molecular models to class, next week.