

CHE 240 Unit II Practice

- 1 Consider the following free radical reaction.



Use a table of bond dissociations energies to calculate ΔH .

Is reaction exo or endo thermic?

Were weaker bonds broken and stronger formed or vice versa?

Experimentally it is found that if the concentration of methyl bromide is doubled, the rate doubles. In another experiment, the concentration of the iodide free radical is halved and the rate is halved. Write the kinetic rate law.

- 2 How does the molecular ion region of the mass spectrum of methyl bromide differ than that of methyl chloride? Sketch them.
- 3 Consider the Arrhenius equation $k = Ae^{-E_a/RT}$
Qualitatively describe how and why changes in A, E_a , and T affect the reaction rate
- 4 What isomer of C_5H_{12} will give only a single product when it undergoes free radical chlorination?
Draw the complete mechanism and calculate ΔH for each step.
- 5 Explain briefly the Hammond Postulate as it relates to energy and transition states of reaction diagrams.
- 6 Propose a structure for $\text{C}_6\text{H}_{12}\text{O}$ given the following data.
IR (cm^{-1}) 3400 broad, 2950, 1200.
MS No M^+ peak, peak at 82m/z
- 7 Propose a structure for $\text{C}_6\text{H}_{12}\text{O}$ given the following data.
IR (cm^{-1}) 3050, 2950, 1660, 1200.
MS M^+ at 100m/z

- 8 Your boss asks you to determine whether an unknown compound is either 1-bromo-butyne, or 3-chloro-butyne.
What would you look for in the IR spectra? Mass spectra?