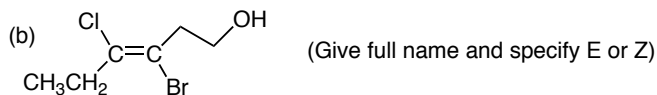
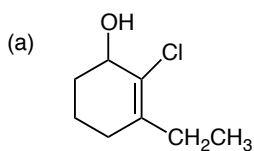
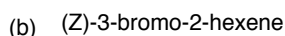
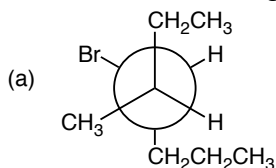


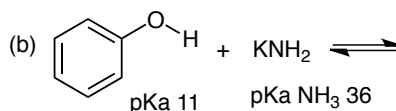
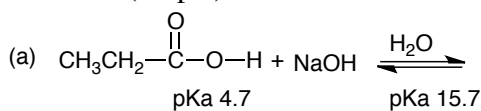
1. Name the following compounds. Be sure to specify E/Z where appropriate. (20 pts)



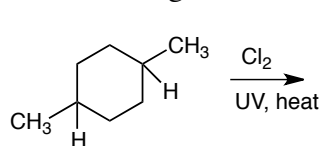
2. Draw the following molecules. (10 pts)



3. Give the products of the following acid-base reactions and in each case calculate the equilibrium constant. (20 pts)

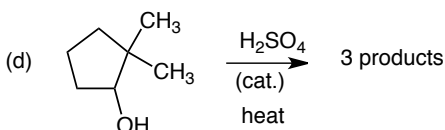
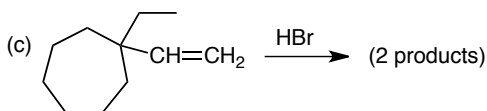
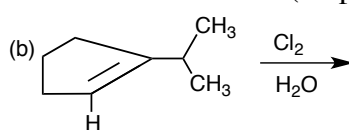
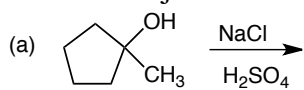


4. For the following reaction (a) show all possible mono-chlorination products. (b) For reaction at the **TERTIARY** hydrogen, show the complete reaction mechanism and calculate the overall ΔH for the reaction using the BDE values given. Choose the best match. (20 pts)

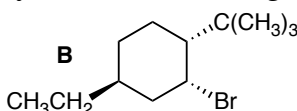
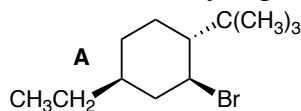


BDE (KJ/mol)			
H—Cl	432	Cl—Cl	243
CH ₃ CH ₂ —H	421	CH ₃ CH ₂ —Cl	351
(CH ₃) ₂ CH—H	413	(CH ₃) ₂ CH—Cl	355
(CH ₃) ₃ C—H	400	(CH ₃) ₃ C—Cl	349

5. Give the product of each of the following reactions and show the **complete** reaction mechanism. If there is a major and minor product indicate these. (60 pts)



6. One of the following molecules reacts rapidly with sodium, ethoxide (NOCH_2CH_3) in ethanol, while the other reacts quickly. Show the reaction that occurs for **BOTH** molecules and indicate which reacts faster and briefly explain why. You must make good chair drawings of each molecule. (30 pts)



BONUS: Show how the following transformation occurs. (10 pts)

