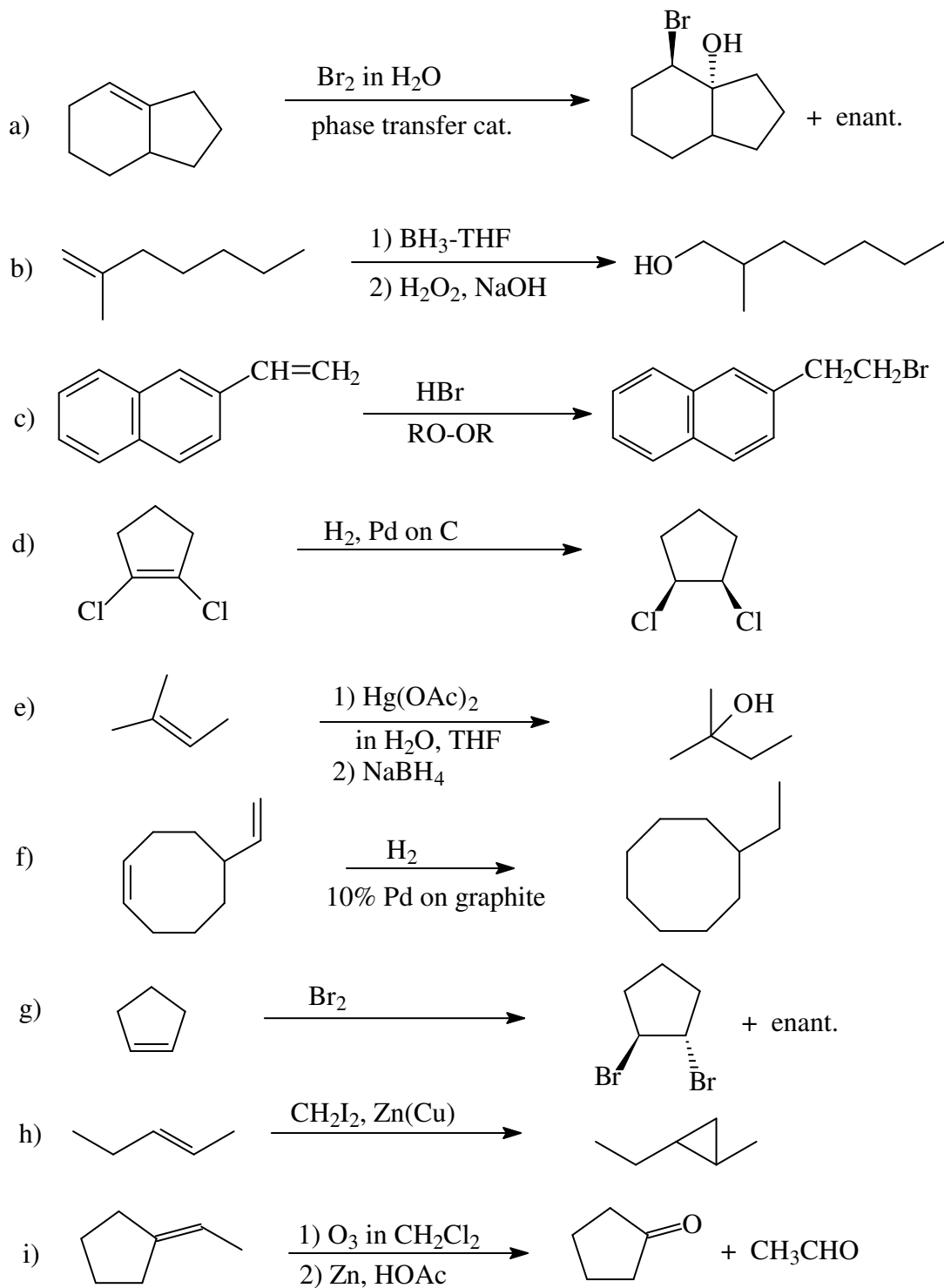
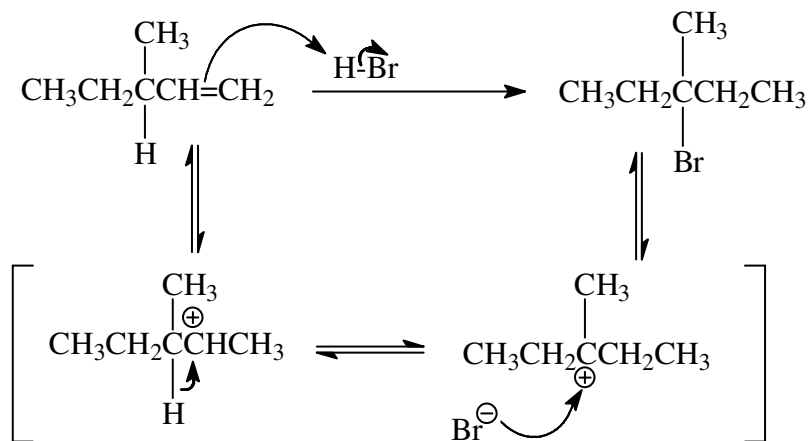


**CHM 241**  
**Problem set on addition reactions**

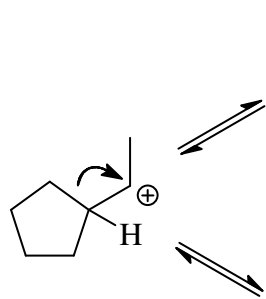
1. Give the major product of the following reactions:



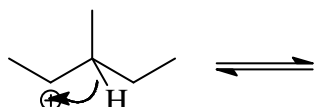
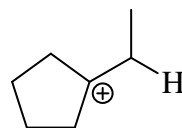
2. Propose a complete mechanism for the following addition reaction. Use arrows to indicate electron flow, and show any intermediate carbocations.



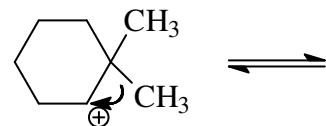
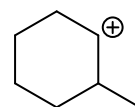
3. The following carbocations can rearrange to more stable intermediates. The cyclic carbocations can rearrange in two different ways. Draw the rearranged carbocations a)-f)



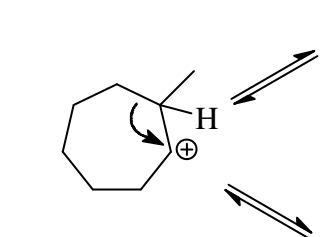
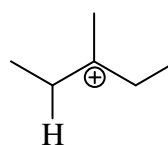
a) hydride shift



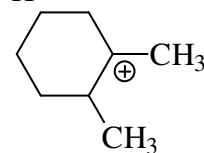
b) ring expansion  
(arrow)



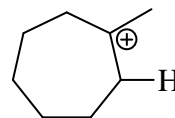
c) hydride shift



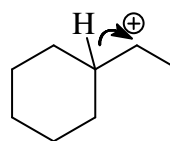
d) methide shift



e) hydride shift



f) ring contraction  
(arrow)



hydride shift

