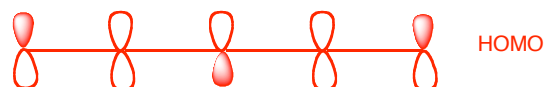
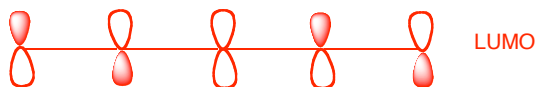
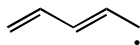
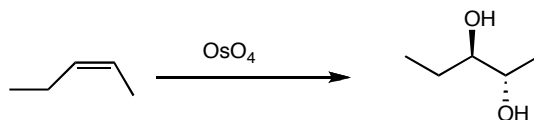


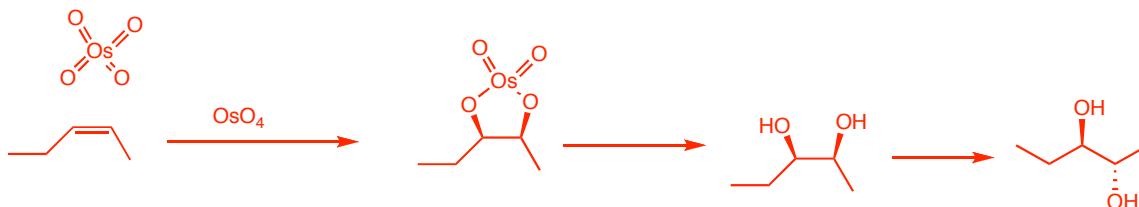
1. Sketch the HOMO and LUMO for pentadienyl radical (consider an orbital with a single electron to still be the HOMO).



2. Show the stereochemistry of the product below, and briefly explain the stereochemical outcome of the reaction. You should use the structure of a transition state or intermediate in your explanation.



The initial addition of OsO_4 to the alkene proceeds through a concerted mechanism, forming the cis osmylate ester, which is then cleaved to the cis diol. Bond rotation to give the more stable conformation gives the trans diol.



3. Give a starting material that will afford the following products by ozonolysis:

