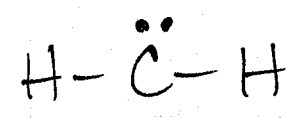
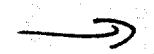
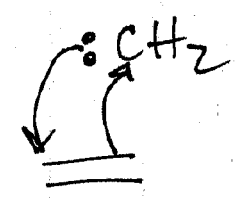


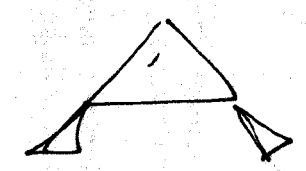
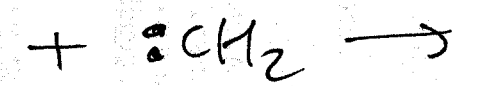
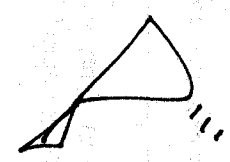
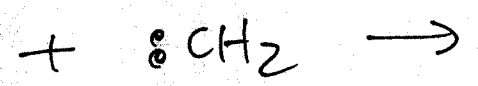
Carbenes - neutral, divalent carbon



highly reactive - only has 6 e's instead of 8.



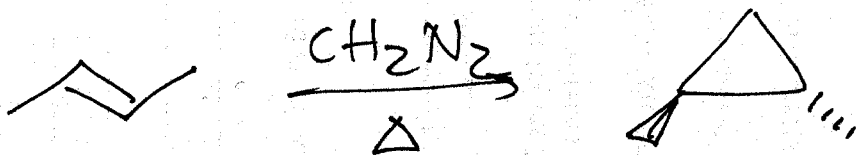
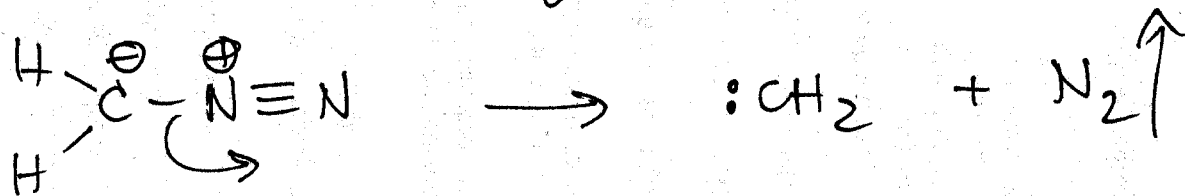
syn addition



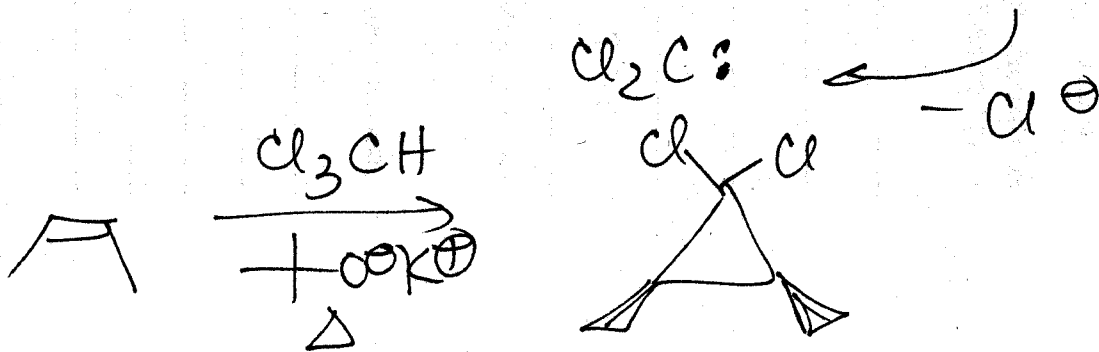
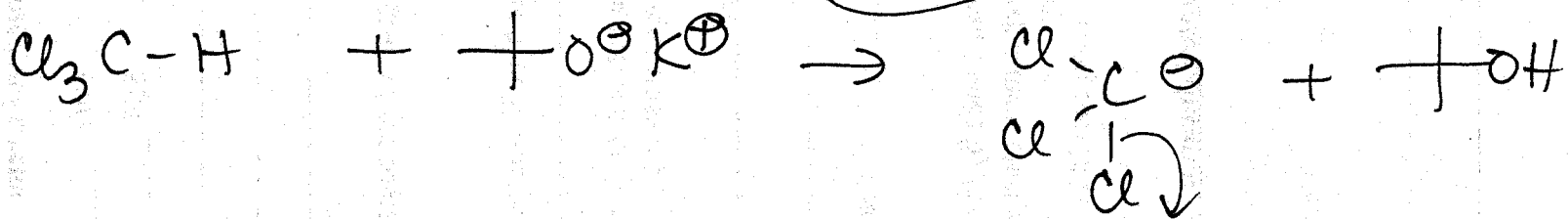
stereochem
of alkene
is retained

Three ways to make carbene / carbenoids.

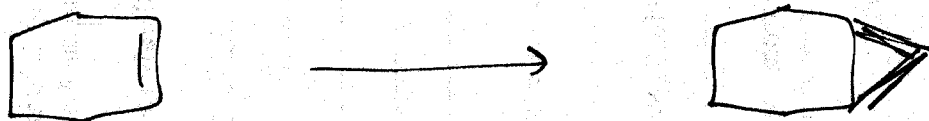
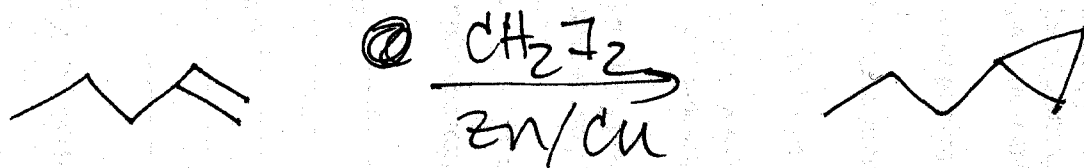
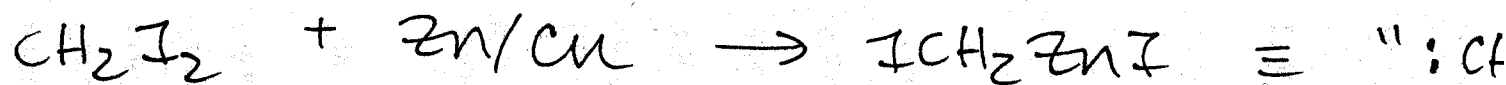
1. Decomposition of diazomethane CH_2N_2



2. α -elim of HCl from CHCl_3 $\text{pK}_a \sim 24$



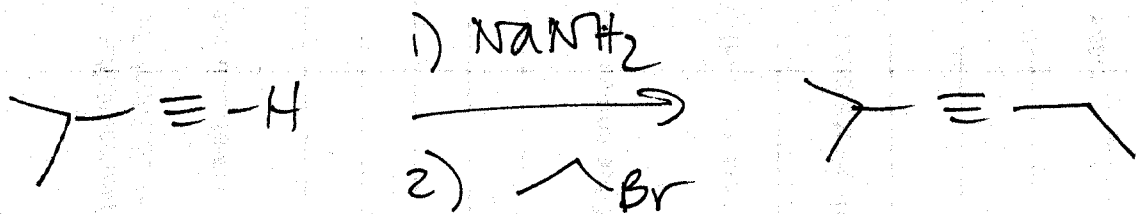
3. Simmons-Smith cyclopropanation



TWO ANSWERS:



or

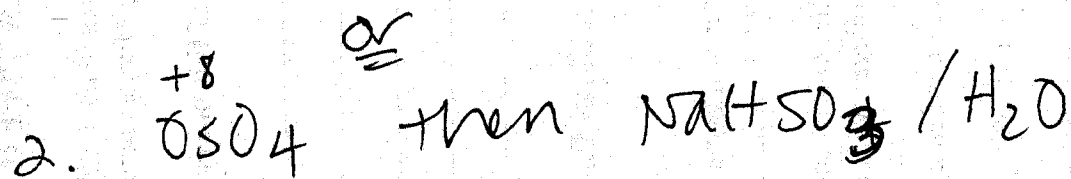
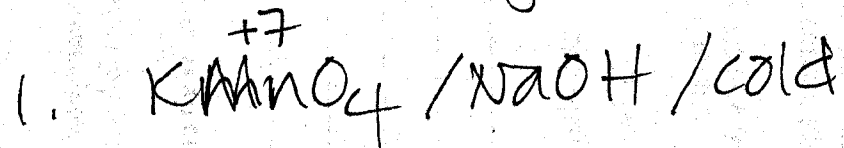


↑
indicate clearly steps #1 and #2

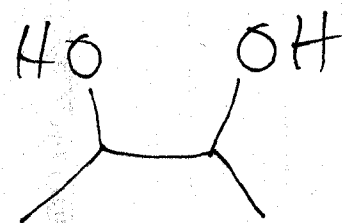
Oxidation of Alkenes

syn hydroxylation \rightarrow vicinal diols

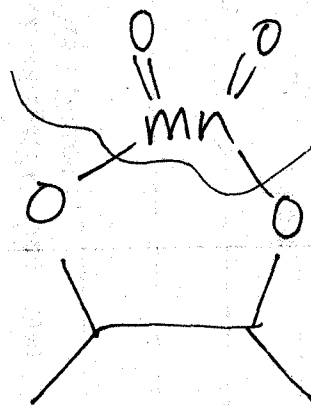
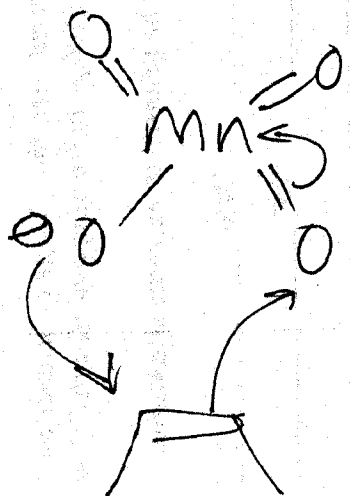
Two sets of reagents:



syn addition

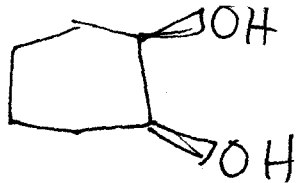
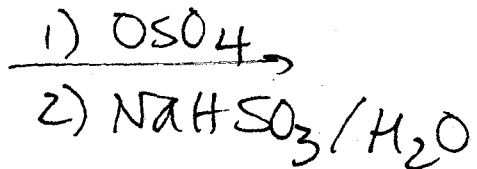


+ MnO₂

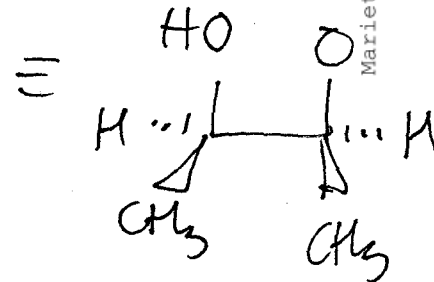
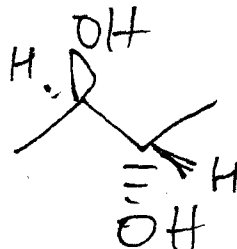
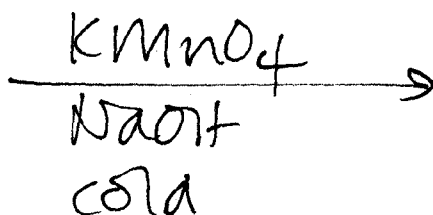


a manganate ester

(osmate ester if using OsO₄)

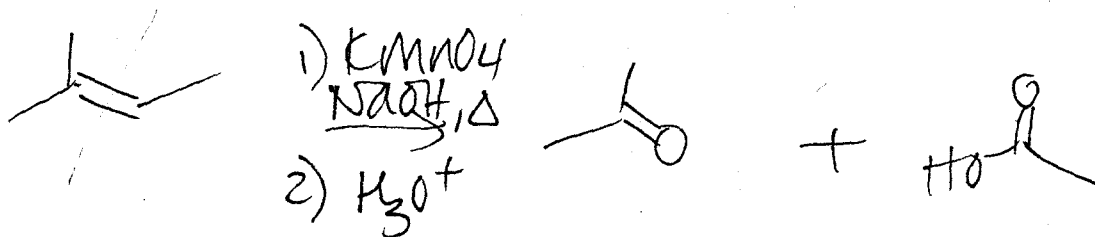
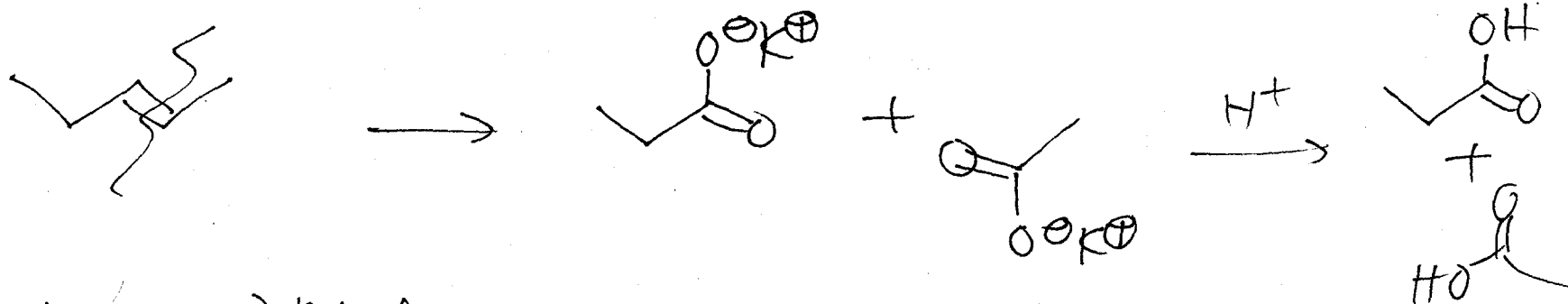


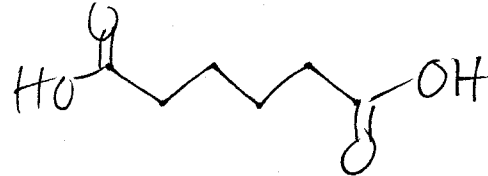
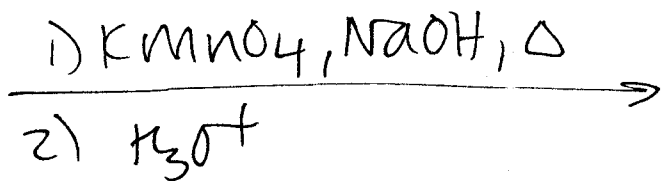
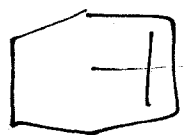
~~KMnO₄~~



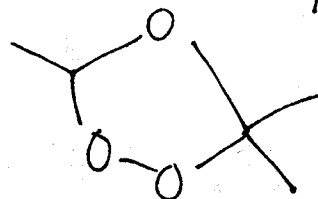
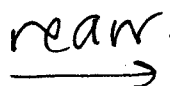
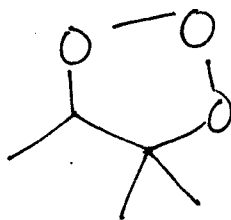
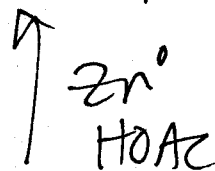
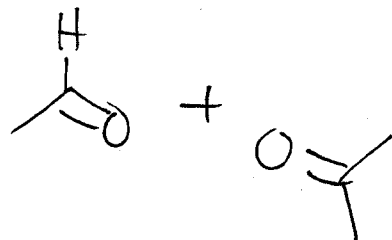
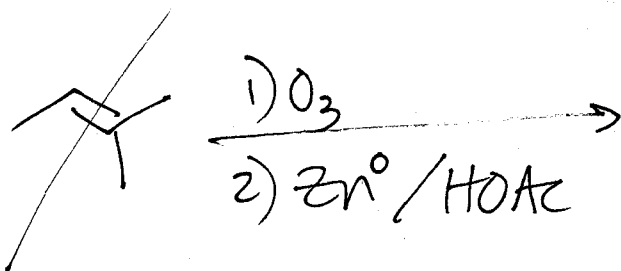
oxidative cleavage of Alkenes — two methods

1. $\text{KMnO}_4, \text{NaOH}, \Delta$





2. Ozonolysis



KMnO_4 method \rightarrow acids
ketones

Ozonolysis \rightarrow aldehydes
ketones



HOAc
 $=$ acetic
acid

$=$ CC(=O)O