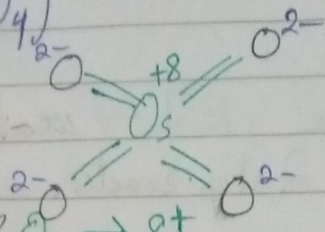
Oxidation (OsO_4)

Structure of OsO_4:-



Oxidation state of $Os \Rightarrow 8^+$

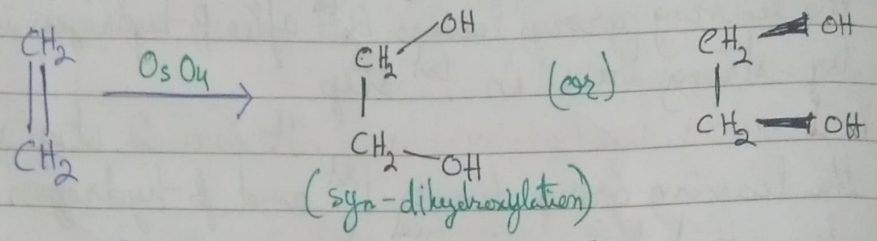
∴ Os is e^- deficient ∴ Os will attack at e^- rich double bond (=)

OsO_4 causes syn-dihydroxylation in alkenes/molecules with double bonds

→ addition of 2OH groups to molecule

→ same side (cis)

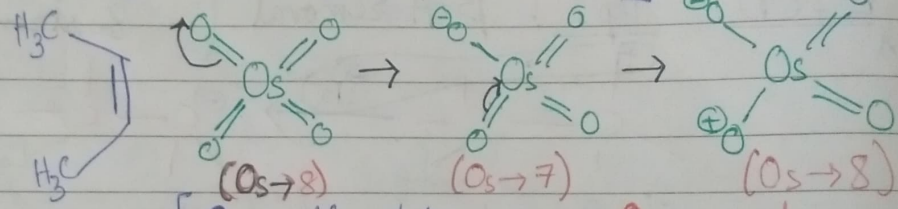
Eg:-



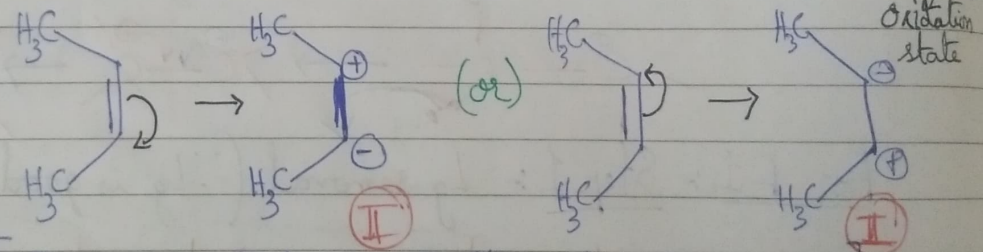
(syn-dihydroxylation)

Mechanism:- [Formation of Syn/Cis diol]

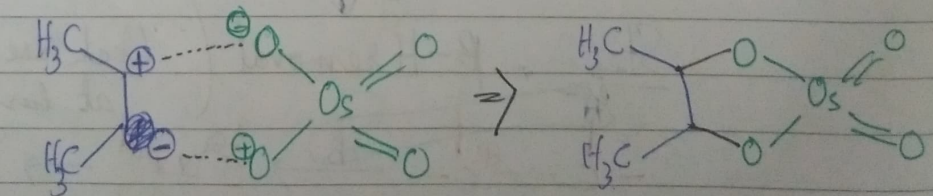
Eg:-

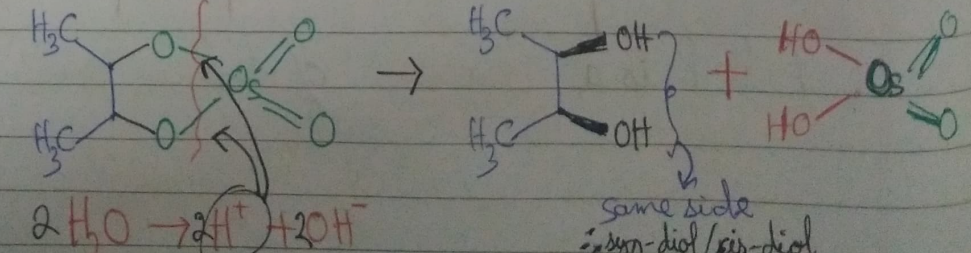
① 

[Overall, in this process, Os → no change in Os oxidation state]

② 

[One side will be -ve & other side will be +ve]

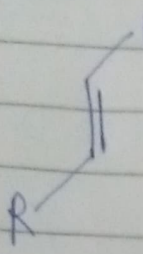
③ 

④ 

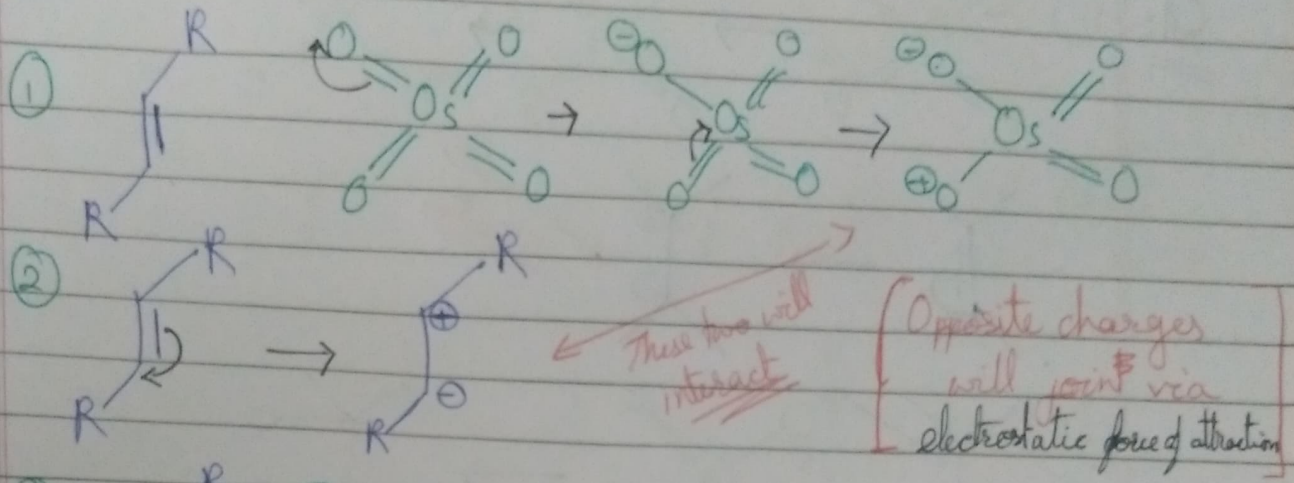
same side
∴ syn-diol/cis-diol

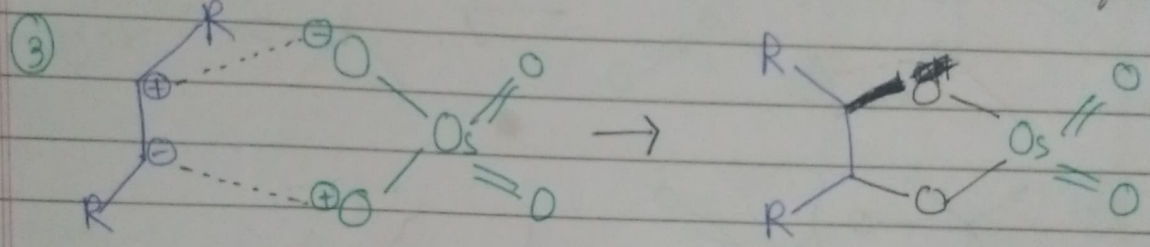
Q. Show dihydroxylation of following molecules with OsO_4 :-

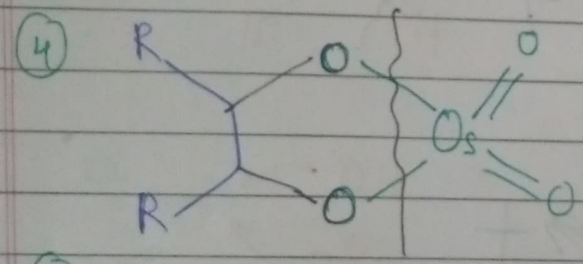
(i)

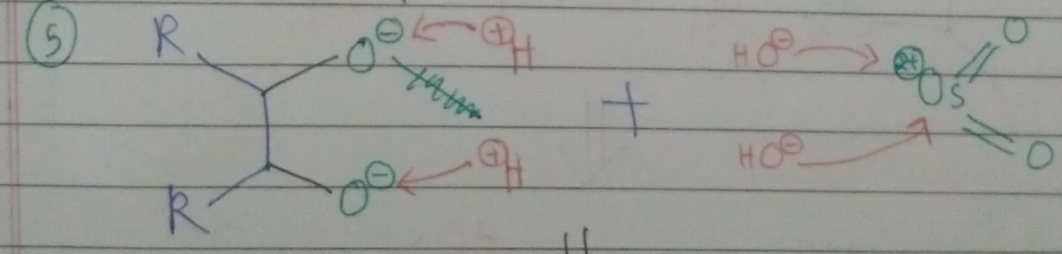


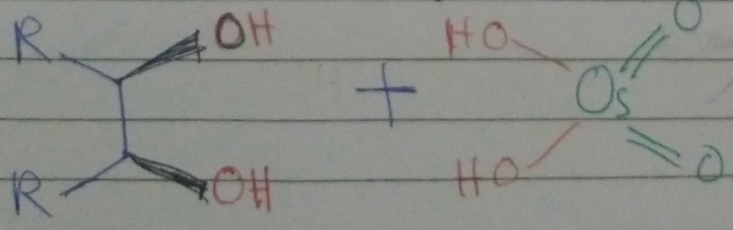
Sol:-



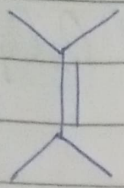






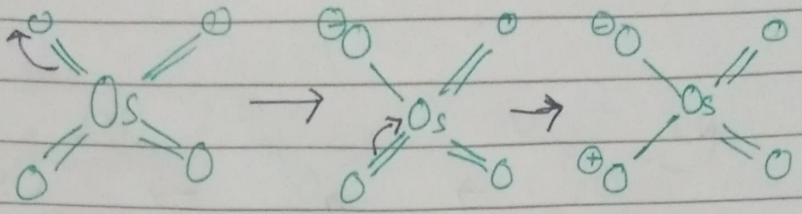


(ii)

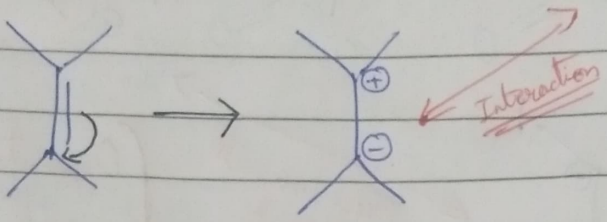


Sol^{n}:-

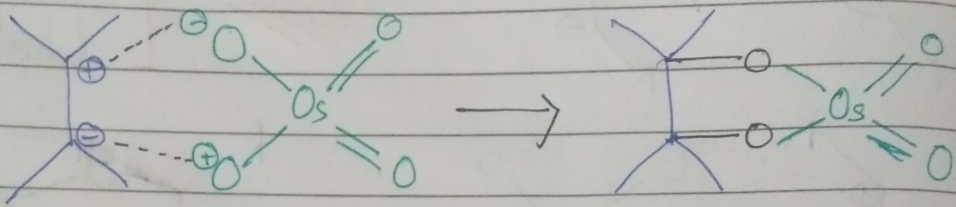
(1)



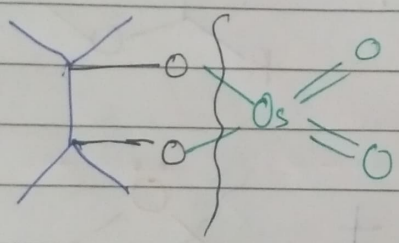
(2)



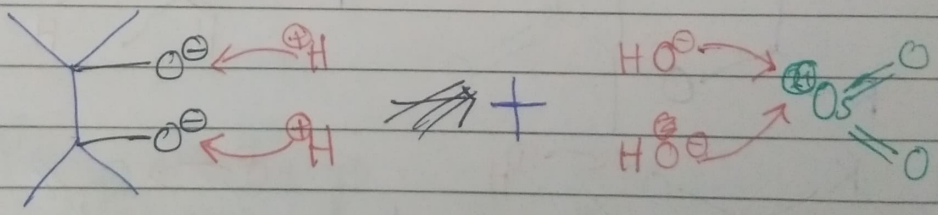
(3)

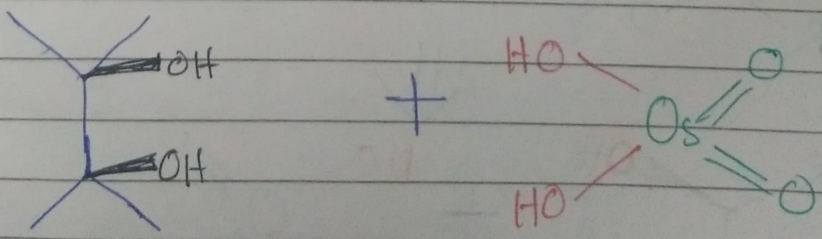


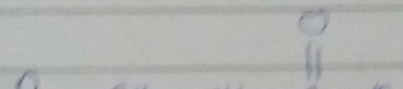
(4)

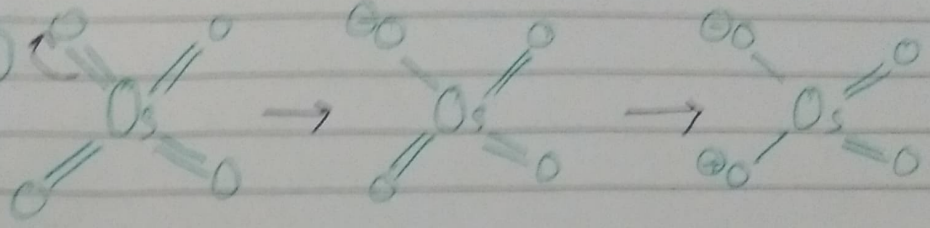


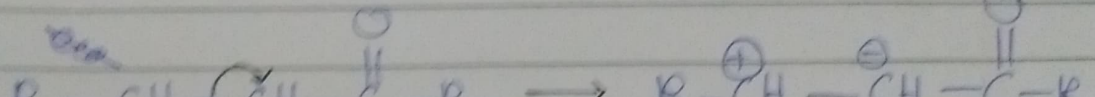
(5)

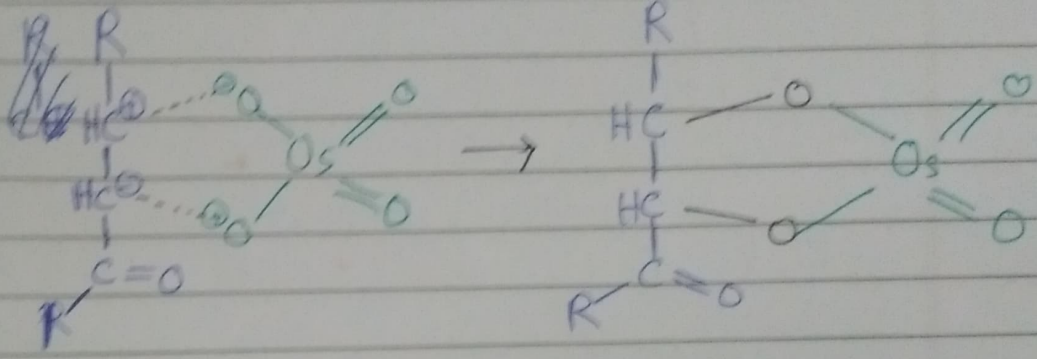


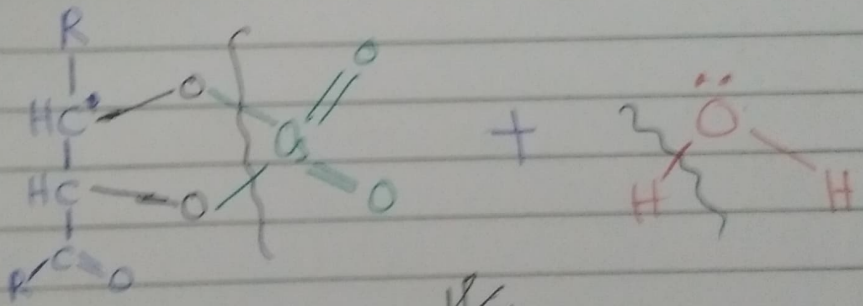


(iii) 

Sol: ① 

② 

③ 

④ 

⑤