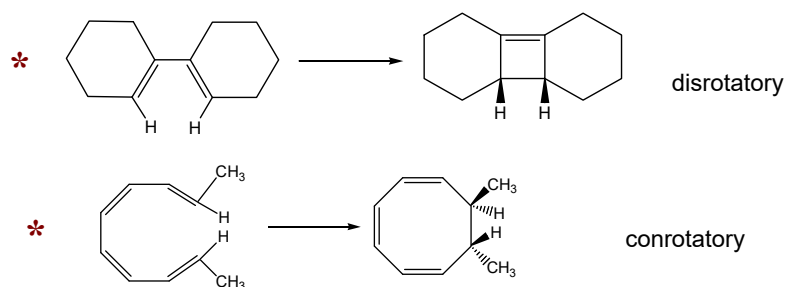
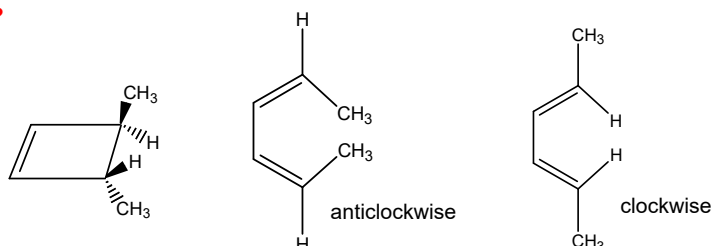
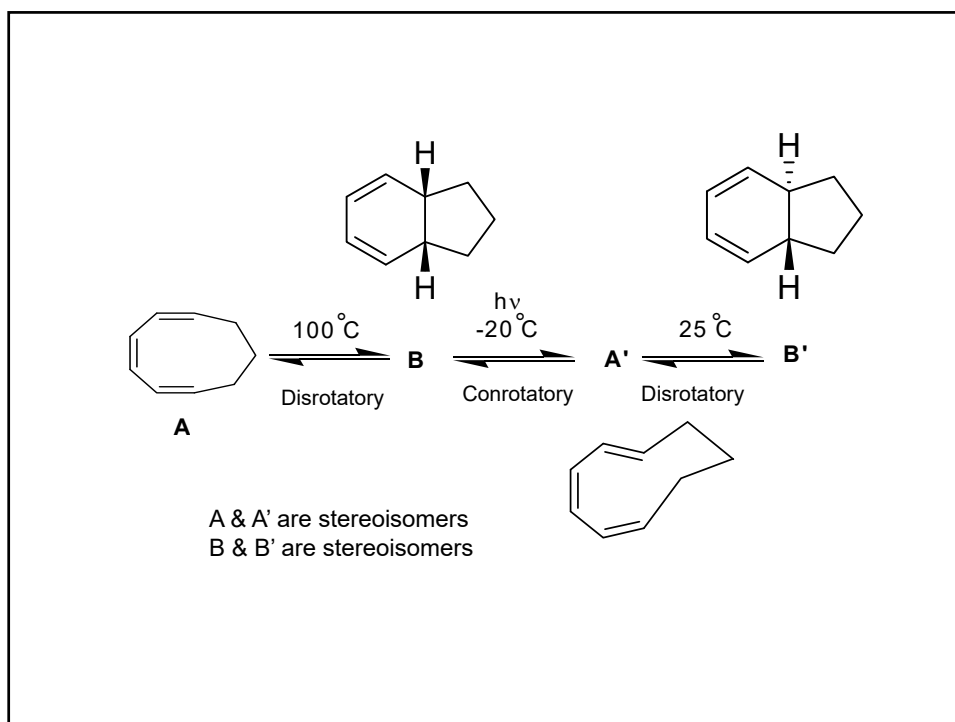


**Q. Have the following reactions proceeded in the conrotatory or disrotatory manner? Should they proceed under thermal or photochemical influence?**



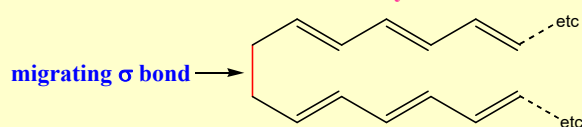
**Q. Show that the cyclobutane below open by two alternative conrotatory processes. What is the product in each instance? Do you expect them to be formed in equal amounts?**





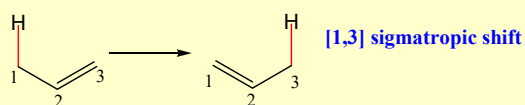
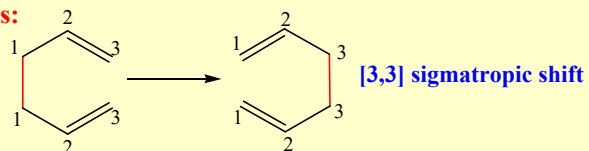
### Sigmatropic reactions

These reactions are defined as involving migration of a  $\sigma$  bond that is flanked by one or more conjugated systems to a new position within the system

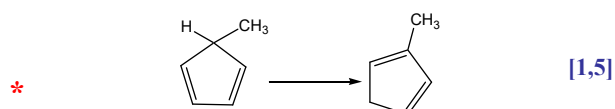
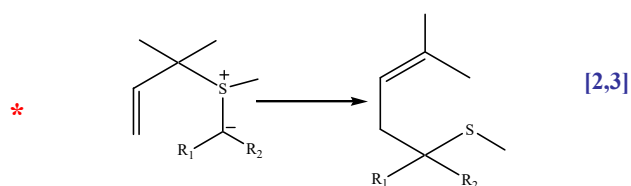
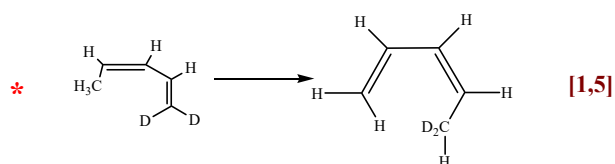


The reaction is termed [ i, j ] sigmatropic shift when the bond migrates from position [1,1] to position [i,j].

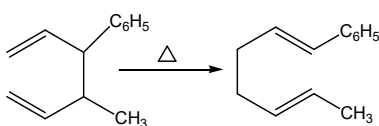
Examples:



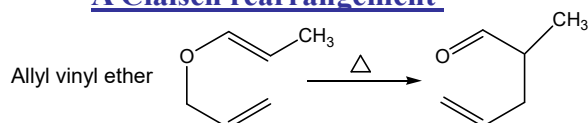
**Q. Classify the following sigmatropic reactions of order [i,j]**



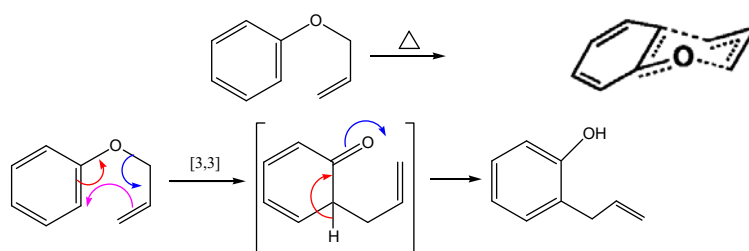
### A Cope rearrangement



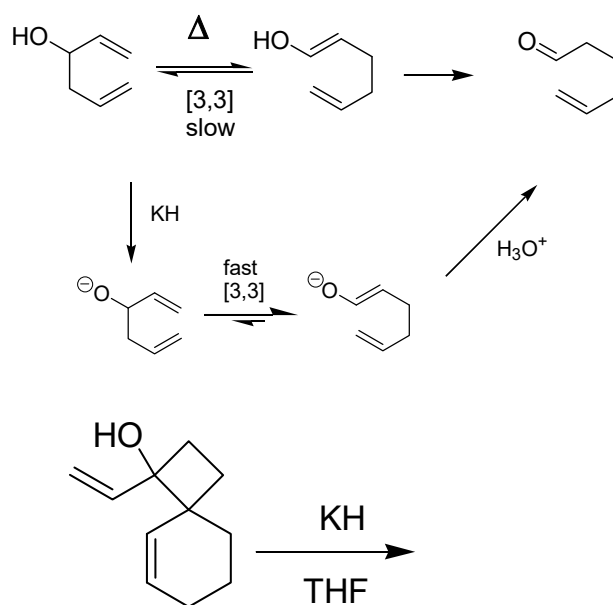
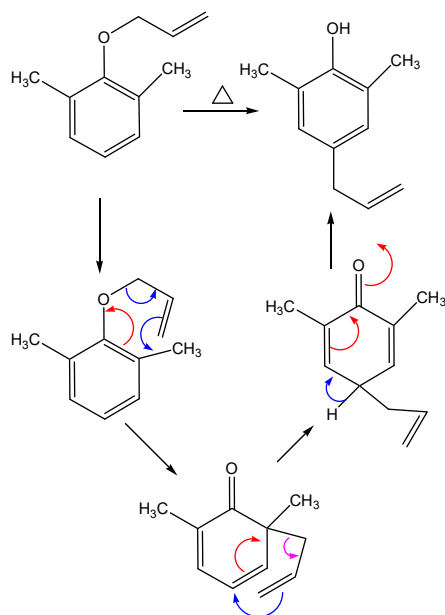
### A Claisen rearrangement



**Q. Give the product of the following reaction.**



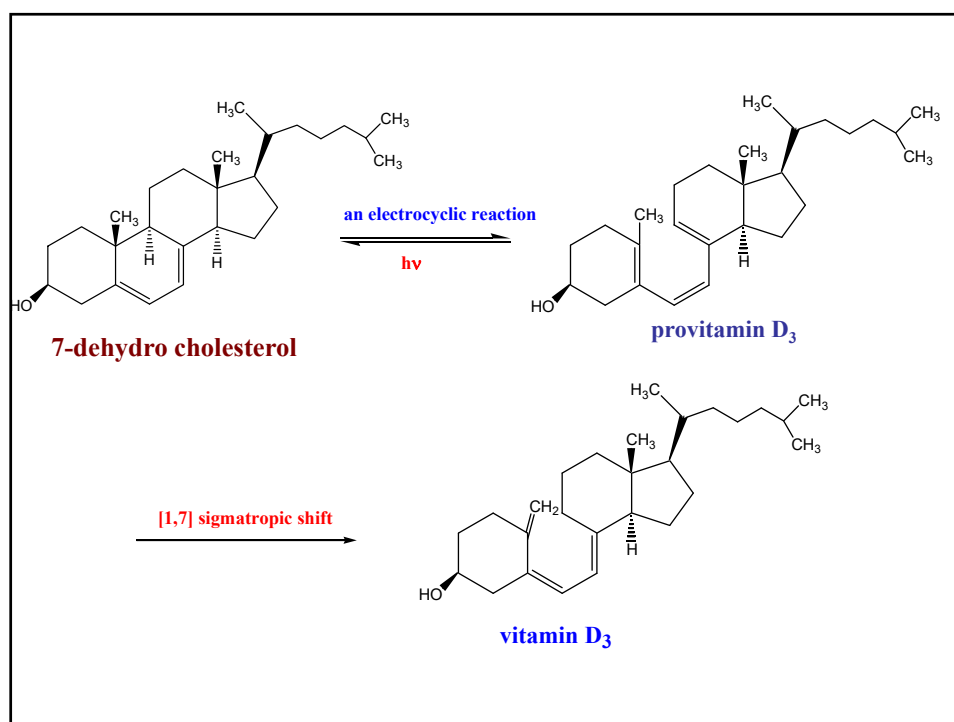
**Q. Suggest a mechanism**



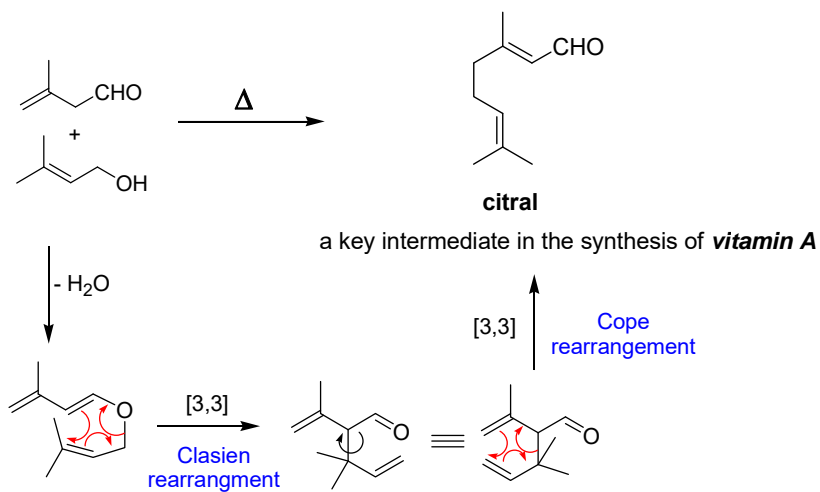
**A biological reaction involving an electrocyclic reaction and a sigmatropic reaction**

**7-dehydrocholesterol, a steroid formed in skin, is converted into Vitamin D<sub>3</sub> by two pericyclic reactions**

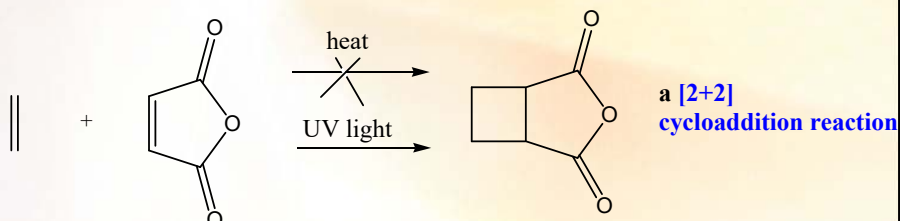
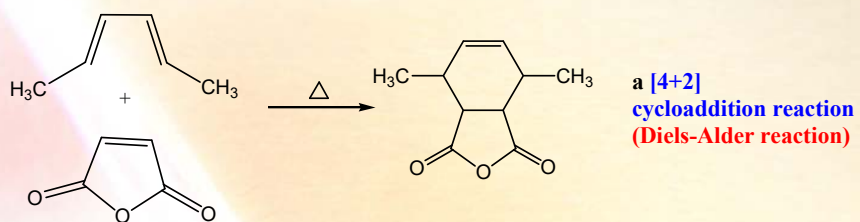
- Deficiency in vitamin D causes rickets.
- Deficiency in vitamin D can be prevented by getting enough sun.
- Too much vitamin D is also harmful – causes calcification of soft tissues
- skin pigmentation protects the skin from the sun's UV rays (it prevents the synthesis of too much vitamin D<sub>3</sub>)



### An industrial synthesis of citral

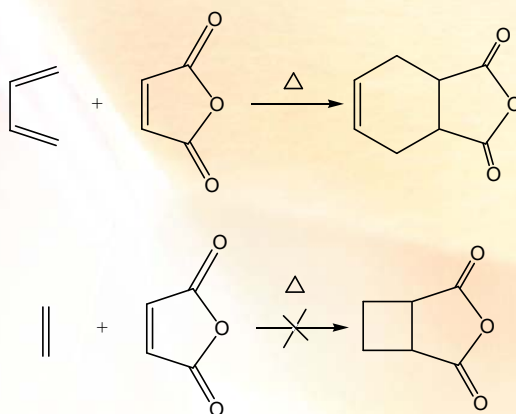


### Cycloaddition reactions

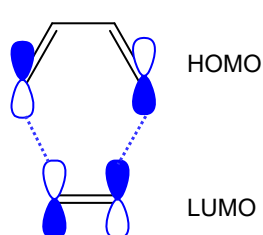
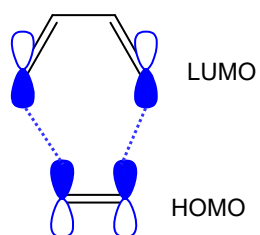
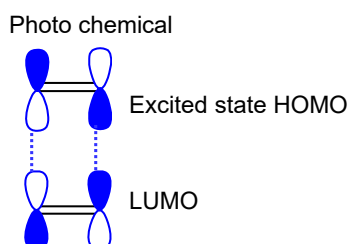
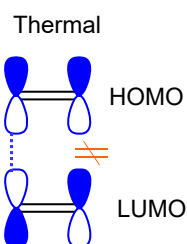


## Cycloaddition reactions

- Why does maleic anhydride react easily with butadiene, but not at all with ethylene?

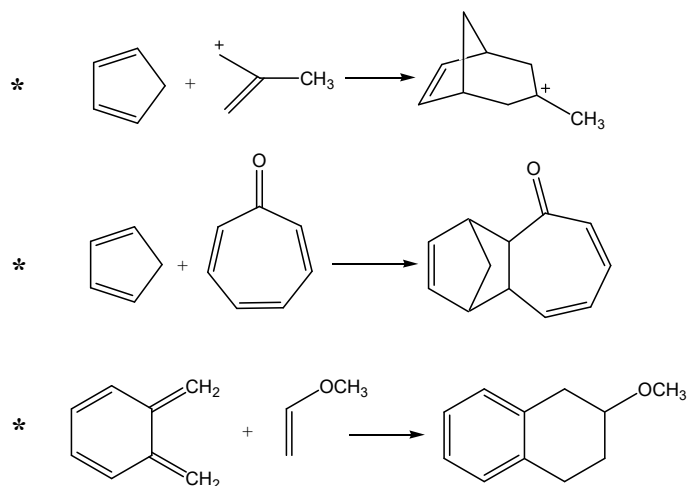


HOMO of one reactant should react with LUMO of the other reactant

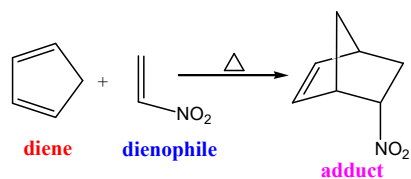
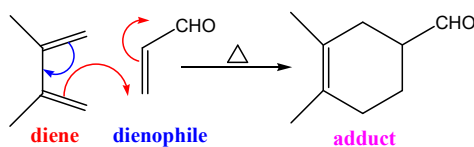




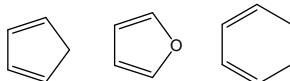
**Q. Classify the following as [m+n] cycloaddition reactions**



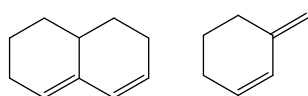
### General description of Diels-Alder reaction



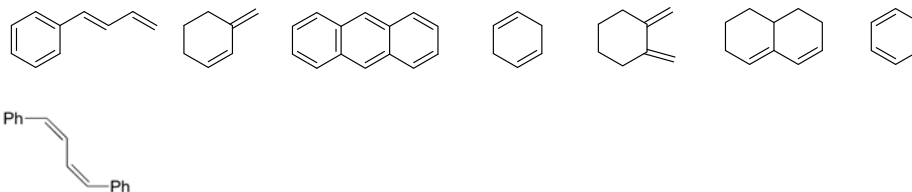
**Dienes permanently in *s-cis* conformation undergo Diels-Alder reactions with ease**



**Dienes permanently in *s-trans* conformation cannot undergo Diels-Alder reaction**



**Q. Which of the following do not respond to the Diels-Alder reaction as a diene?**



**Q. Arrange the following dienes according to their reactivity towards Diels-Alder reaction**

