

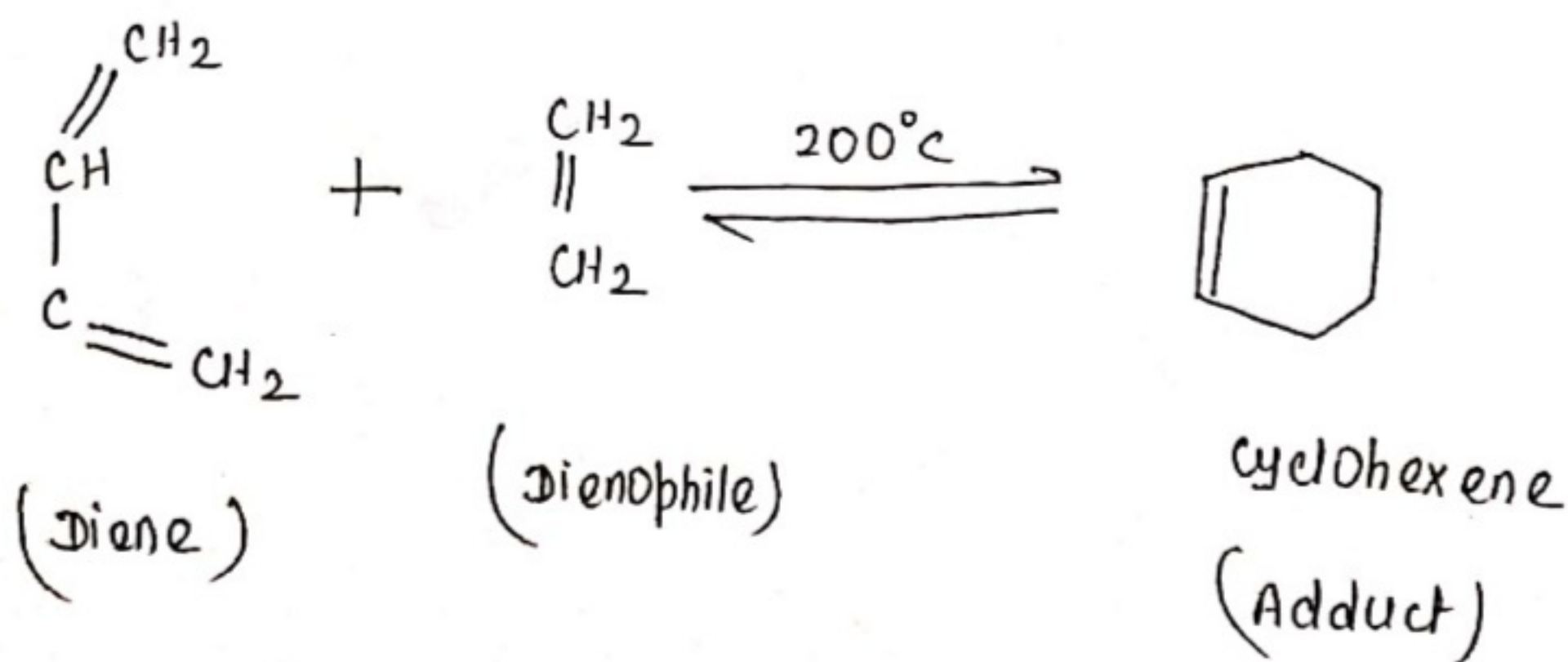
# ORGANIC NAMED REACTION

DEGREE-III (H), PAPER-VII

## TOPIC :- DIEL'S ALDER REACTION

LECTURE-5, DATE : 14/09/2020

- \* Diels - Alder reaction consists of the addition of a conjugated diene to a second unsaturated molecule, generally called as a dienophile, resulting in the formation of a cyclic compound, commonly known as adduct.
- \* The reaction is initiated thermally (by Heat) or by Lewis acid catalyst with or without the use of solvents.
- \* The simplest example is the reaction between butadiene and ethylene.



- \* These are the cycloaddition reaction (The addition reaction in which ring systems are formed).
- \* Since, the Diels - Alder reaction involves a system of  $4\pi$  electrons (the diene) and a system of  $2\pi$  electron (the dienophile), it is known as a  $[4+2]$  cycloaddition.
- \* In Diels - Alder reaction two new  $\sigma$ -bonds are formed at the expense of two  $\pi$ -bonds in starting materials.
- \* Normally the reaction is carried out either by heating the components alone or in an inert solvent (benzene or toluene), the temperature required depends upon the structure of the reactants.

## Components of the Diel's-Alder Reaction

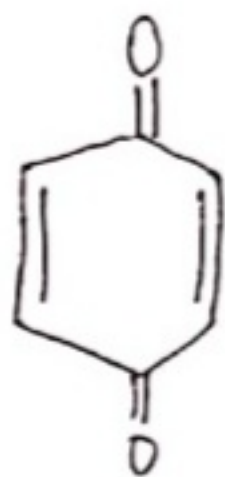
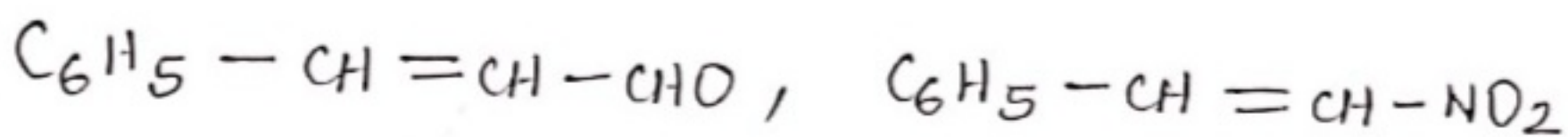
### A. Dienophiles

Although some of the simple olefins, e.g. ethylene function as a dienophile, the best dienophiles is an unsaturated olefinic or acetylenic compound

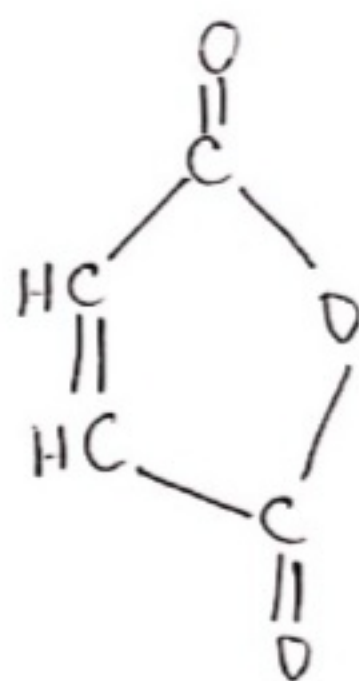
3.

having -M group (viz.  $>C=O$ ,  $NO_2$ ,  $CN$ ,  $COOH$ , etc.) in conjugation with the unsaturated double bond.

\* Some of the important dienophiles are described below:-

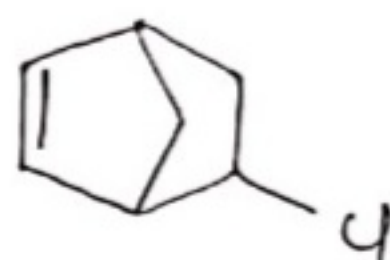
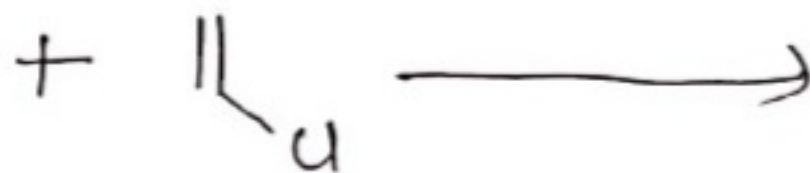


p-benzoquinone



maleic anhydride

\* dienophiles having -I group are of great synthetic importance although they may react with some of the dienes at a moderate rate,



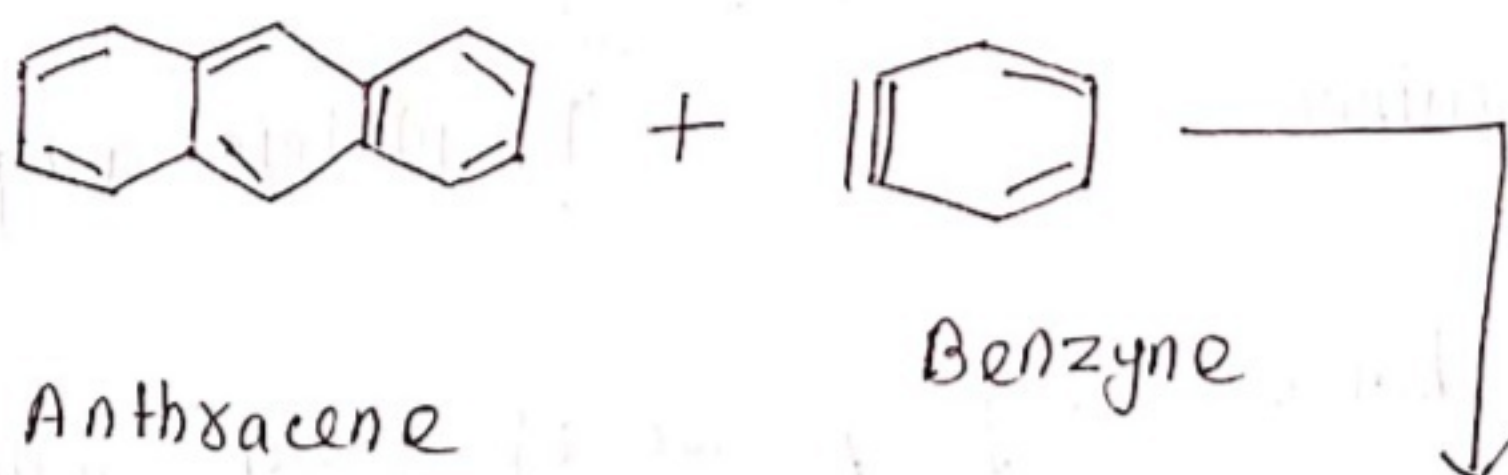
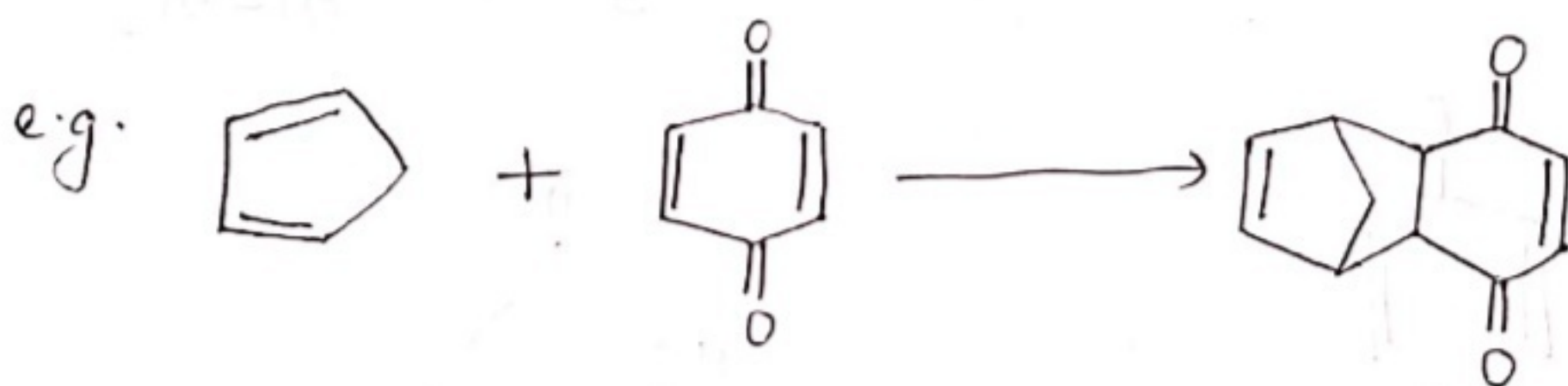
cyclopenta-

vinylchloride

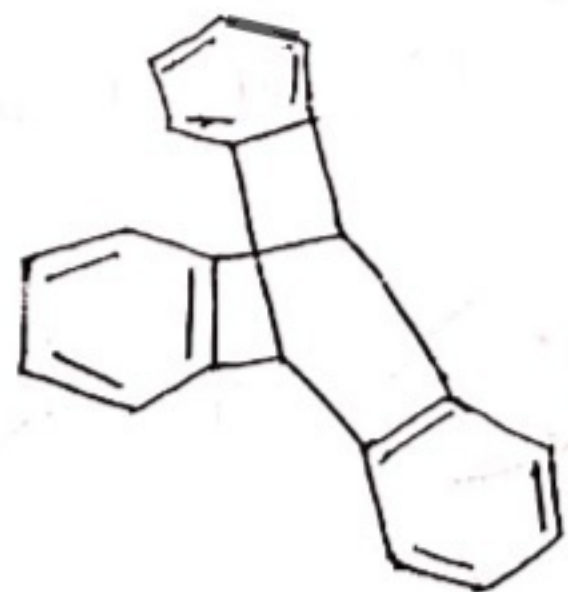


## B. Diene

\* Diene may be an open chain or cyclic conjugated compound, e.g. butadiene, cyclopentadiene, anthracene, furan, etc.



\* Benzene, naphthalene and phenanthrene are very unreactive towards dienophiles.



To be continued in next lecture..