

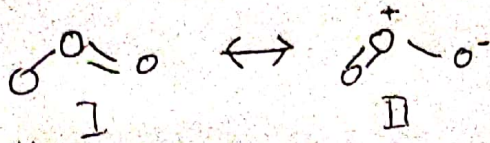
Resonance

Part I

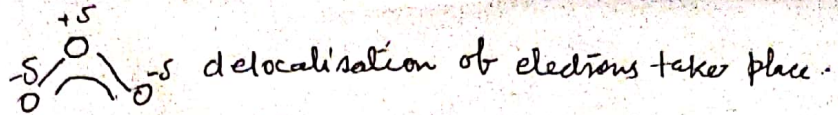
Date - 15.7.2020

Dr. Shashi Kumari Singh

This is the structure of ozone.

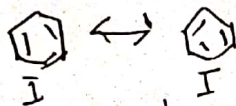


The real structure of ozone is

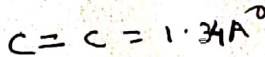


Structure of resonance I and II are imaginary structures. These two structures are given by scientist to solve the problems and structure I and II are known as canonical form.

Benzene

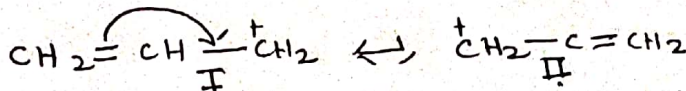


canonical structure real bond length = 1.34 \AA indicate.



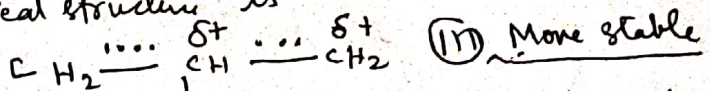
C_6H_6 - delocalisation of electron

What is resonance - the delocalisation of π electrons and lone pairs in parallel p-orbitals is known as resonance.

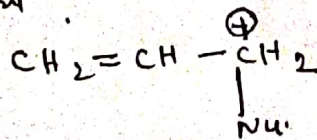


These two are imaginary structures

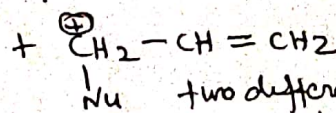
real structure is



Example get two products



If we add nucleophile we get two products.



two different products.

these canonical structures use to explain the properties.

Tips for resonance.

Molecule can be represented by two or more structures. Resonating structures. None of them explain all properties. Real hybrid. These all canonical structures they contribute the real structure.

- ② Real structure $\begin{cases} \text{more} \\ \text{less} \end{cases}$
- major contribution - more stable with less energy
 - Minimum properties - less stable max Energy
- ④ Real structure contributes to real hybrid is there \uparrow no. of R.S. \rightarrow more stable Resonating structure
- ⑤ equal contribution - stability is specially high, even if total no. of Resonating structures is less

When Resonance takes place.

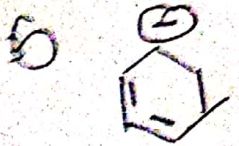
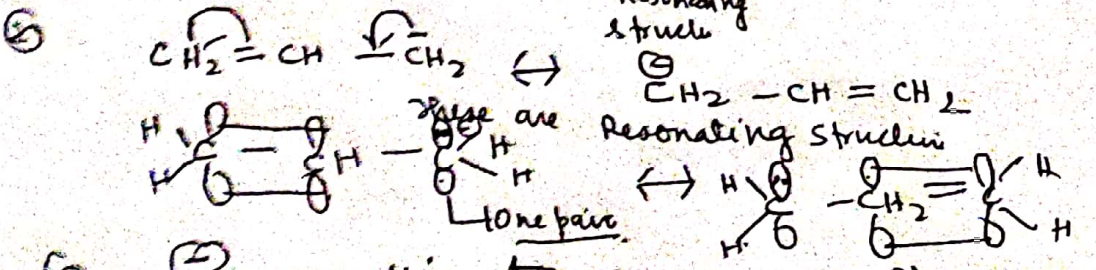
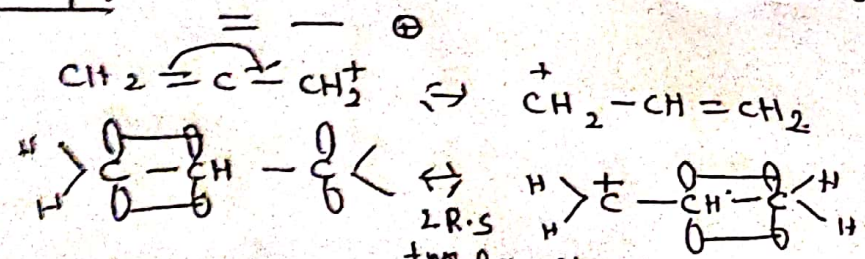
Resonance takes place in conjugated system \rightarrow the system having parallel p-orbitals along with atleast one πe^- pair.

Types

- $\overset{\ominus}{\text{C}} = \overset{\oplus}{\text{C}}$ \oplus charge (vacant p-orbital)
- $\overset{\ominus}{\text{C}} = \text{C} - \overset{\ominus}{\text{C}}$ \ominus (fully filled p-orbital)
- $\overset{\ominus}{\text{C}} = \text{C} - \overset{\ominus}{\text{C}}$ ~~half filled~~ half filled p-orbitals
- $\overset{\ominus}{\text{C}} = \text{C} = \overset{\ominus}{\text{C}}$
- $\overset{\ominus}{\text{C}} + \text{C} - \overset{\ominus}{\text{C}}$ lone pair vacant p-orbital
- $\overset{\ominus}{\text{C}} - \text{C} - \overset{\ominus}{\text{C}}$ (vacant d-orbitals)

these six types different conjugated system

Example



As this show show Resonance. \uparrow there are overlapping