## **Some Facts about Benzene**

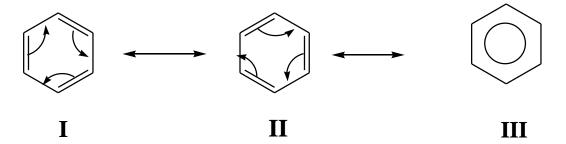
- 1. Benzene have the molecular formula  $C_6H_6$
- 2- The structure of benzene is highly unsaturated cyclic compound. The suggested structure as shown below.



- 3- All carbon atoms are sp<sup>2</sup> hybridized
- 4- There is a single and double bonds. This means there should be two length c-c bonds one represents a single bond and the other represents a double bond.

But using x-ray measurement, it shows that all c-c bonds length are equal which is an intermediate between a single and a double one

This because there is a resonance in the molecule which causes the single and double bonds to alternate as follows



5- Despite it has C-C double bonds, it does not undergoes addition reactions like alkenes. It undergoes substitution reactions.

$$C_6H_6 + Br_2 \xrightarrow{FeBr_3} C_6H_5Br + HBr$$
benzene bromobenzene

m-bromonitrobenzene

o-ethylnitrobenzene

p-bromoethylbenzene

m-bromotoulene

$$CH_3$$
 p-xylene  $CH_3$