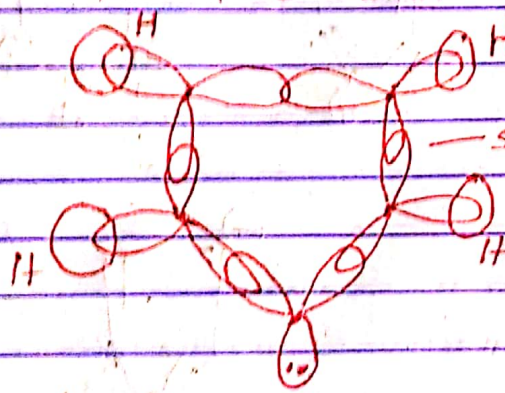
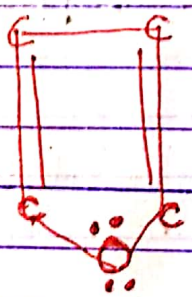
B.Sc. III (H) PAPER- VII

Furan

Furan is a heterocyclic compound. It has five atoms in ring in which one is oxygen and four are carbon atom.

All atoms of ring is sp^2 hybrid. sp^2 hybrid orbitals of furan overlaps each other and s orbital of H to form C—C, C—O and C—H σ bonds. One sp^2 hybrid orbital of oxygen contain one lone pair of electron.





Furan

All carbon atom and oxygen atom contains one unhybrid P orbital which is perpendicular to the plane of sp^2 hybrid orbital. They unhybrid orbital over each other.

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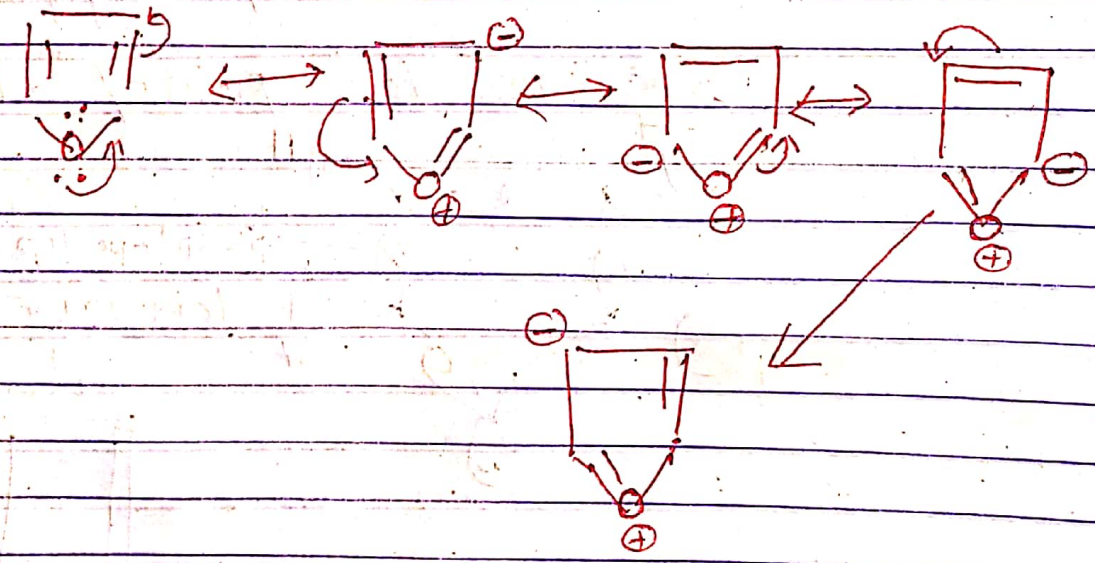
to form π p-p bonds. The lateral overlap of these p-orbitals forms π molecular orbital containing 6 electrons and hence they satisfies Hückel rule's of aromaticity.

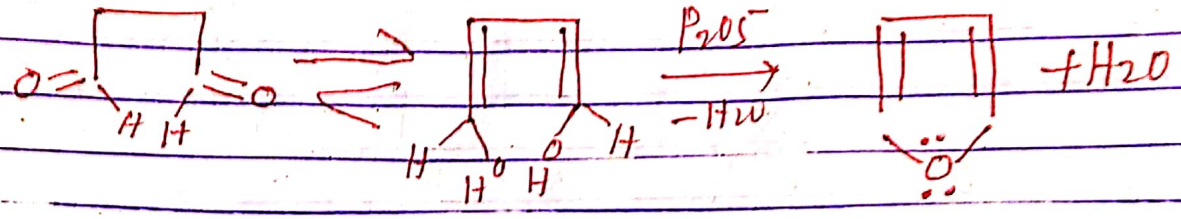
The ring represents the π molecular orbital as below

Furan has five resonance structure as shown below.

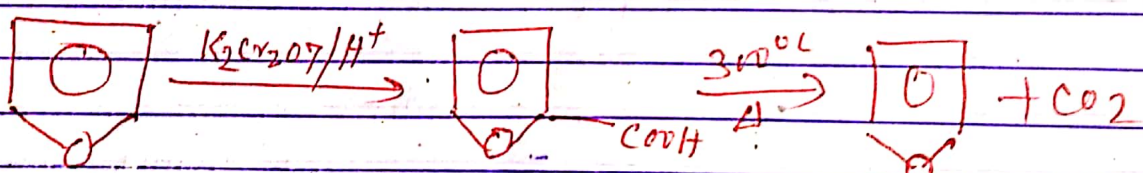


Preparation of furan →

(i) The dehydration of succinic dialdehyde by heating with P_2O_5 or $ZnCl_2$ give rise to furan.



(ii) Oxidation of furfural with potassium dicromate give furoic acid. ~~acid~~. ~~then~~ Decarboxylation at 200°C-300°C eventually leads to furan.



Furoic acid

furan.

(iii) The decarbonylation of furfural in steam in presence of silver oxide catalyst give furan. This is commercial preparation of furan.

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