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ALDEHYDES AND KETONES

Introduction:-

Organic Compounds having $>C=O$ group are Called Carbonyl Compound and $>C=O$ group is known as Carbonyl or OXO group. It's formula is $C_nH_{2n}O$ ($n = 1, 2, 3 \ldots$) Carbonyl Compounds are grouped into two Categories.

(a) Aldehydes: Aldehyde group is $-\overset{O}{\overset{\|}{C}}-H$ (also known as formyl group). It is a monovalent group.

(b) Ketones: The carbonyl group ($>C=O$) is a ketonic group when its both the valencies are satisfied by alkyl group. It is a bivalent group.

- Ketones are further classified as :-

(i) Simple or Symmetrical ketones: Having two

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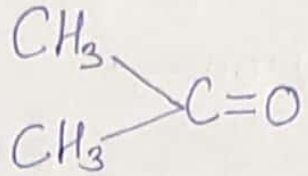
similar alkyl groups. $\begin{matrix} R \\ R \end{matrix}\!\!>C=O$

(ii) Mixed or unsymmetrical ketones: Having two different alkyl groups $\begin{matrix} R \\ R \end{matrix}\!\!>C=O$

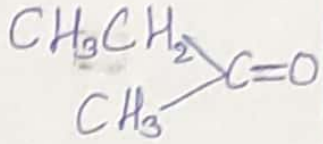
<u>Example</u>: (Ketones): Symmetrical



(Acetone or Dimethylketone)

2 - Propanone

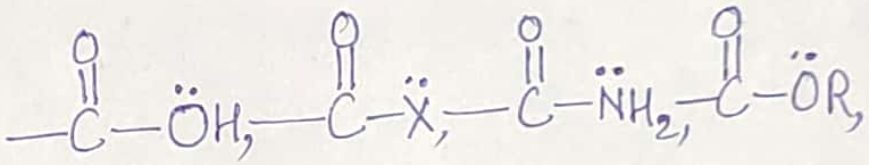
unsymmetrical



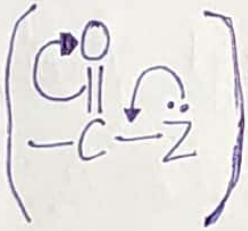
(Ethyl methyl ketone)

2-Butanone

Special point:



In all the compounds given above, alone pair of electrons and double bond are conjugate.



So resonance occurs. These compounds have $-\overset{O}{\overset{\|}{C}}-$ group still they are not carbonyl compounds because carbonyl group takes parts in resonance with the lone pair of electrons.

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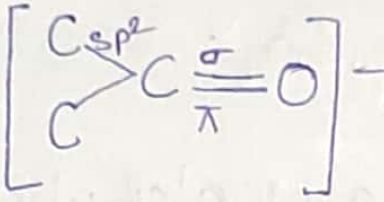
◆ Structure :

In $>C=O$ Compounds C-atom is sp^2 hybridised which forms two σ bonds with C and H-atom respectively and one σ bond with oxygen atom. The unhybridised atomic orbital of C-atom and the parallel 2p orbital of oxygen atom give the π bond in $>C=O$ group.



The C—C—O and H—C—O bond angles are of 120.

Due to electro-negativity difference in C & O atoms, the $>C=O$ group is polar.

$>\overset{\delta+}{C}=\overset{\delta-}{O}$ Hence aldehydes and ketones posses dipole moment.

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