

# basic concept of organic chem.

## # Organic Compound:

- those compound which contains carbon elements except: oxide, carbonate, cyanide, bicarbonate, etc.

\* Why carbon is so special element?


→ As carbon have special properties of Tetravalency (capacity to have 4 bonds); cationation (self-linkage)

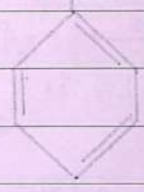
\* cationation decreases down the group.

→ 4 types of cationations:

I.) linear → C-C-C-C-C

II.) branched →  $\begin{matrix} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{matrix}$

III.) cyclic → 



\* also multiple bond forming capacity makes carbon a special element.

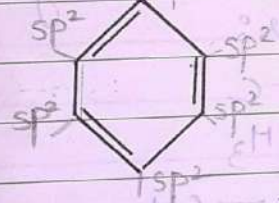
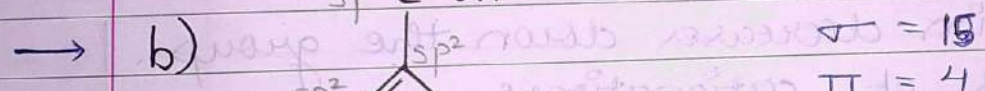
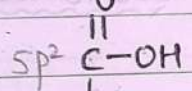
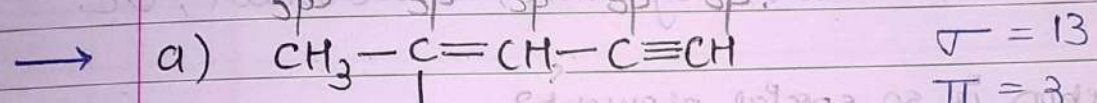
eg: double and triple bonds.

\* also smaller size of it plays role.

## \* Hybridisation of carbon

	no. of $\sigma$ bond	no. of $\pi$ bond	hybridisation
i.	4	0	$sp^3$
ii.	3	1	$sp^2$
iii.	2	2	$sp$

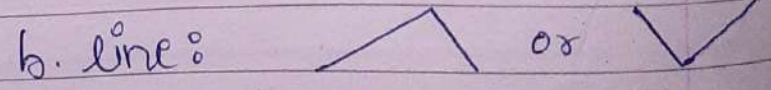
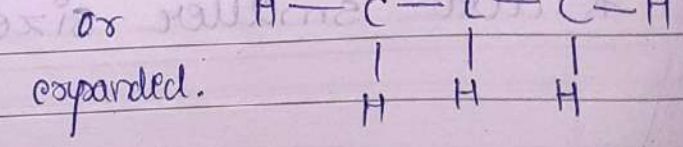
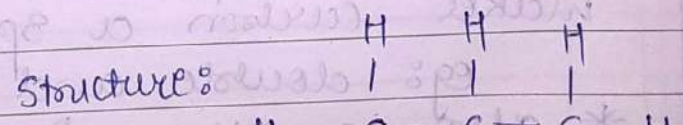
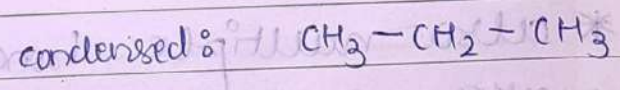
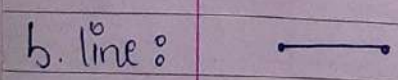
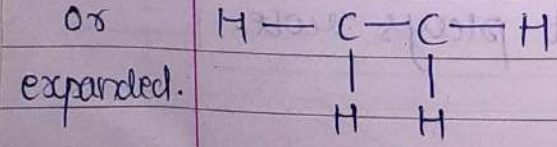
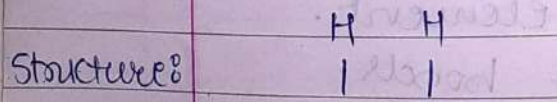
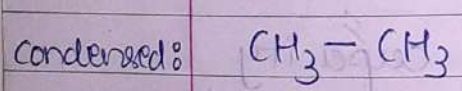
Q:1 Give hybridisation:



## \* Representation of Org. Compounds

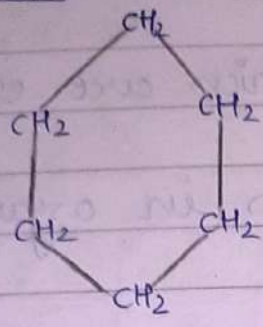
1.)  $C_2H_6$ : Ethane

2.)  $C_3H_8$ : Propane

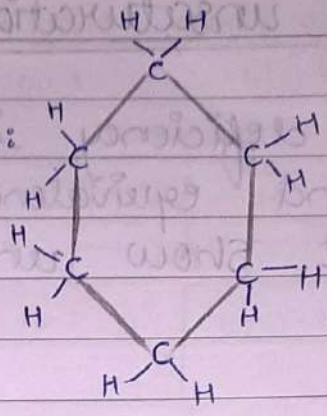


3)  $C_6H_{12}$  cyclohexane: *nitrobenzene jo galyat \**

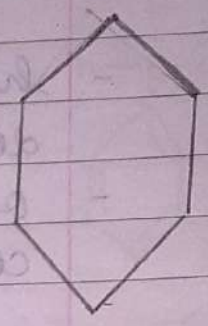
cond:



struc:

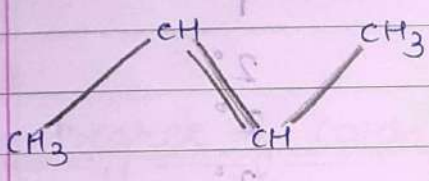


b.line:

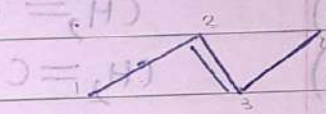


4)  $CH_3-CH=CH-CH_3$

struc:

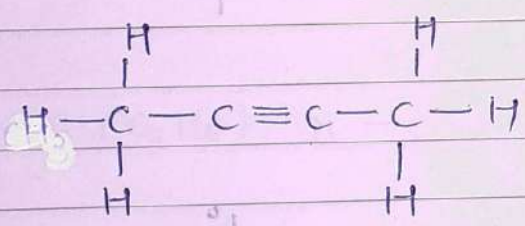


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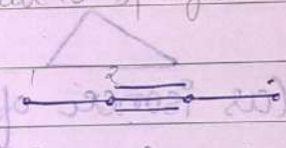


5)  $CH_3-C \equiv C-CH_3$

struc:



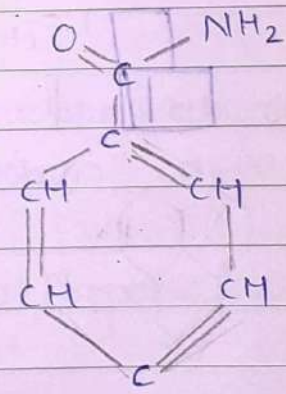
b.line:

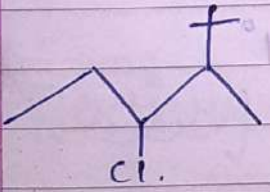


6) 

b.line:

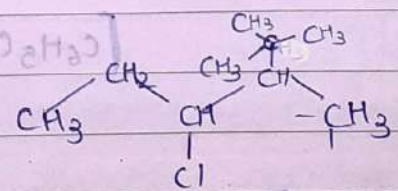
struc:

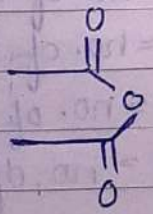


7) 

b.line:

struc:



8) 





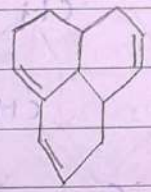

b.line:

struc:  $CH_3-C(=O)-O-C(=O)-CH_3$

Ethanoic anhydride.

## \* Degree of unsaturation:

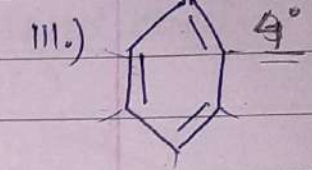
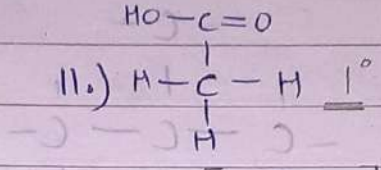
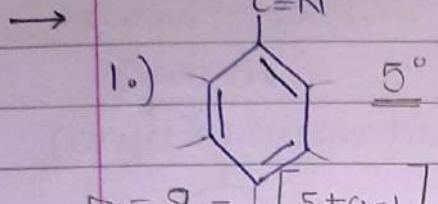
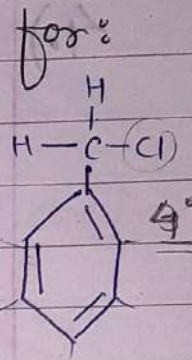
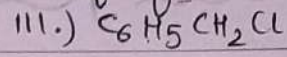
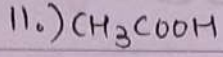
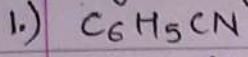
- hydrogen deficiency index which are equal to double bond equivalence.
- overall it show unsaturation in organic compound.

	Molecule	Degree of Unsat.
I.)	$\text{CH}_3 - \text{CH}_3$	0
II.)	$\text{CH}_2 = \text{CH}_2$	1°
III.)	 $\text{CH}_2 = \text{C} = \text{CH}_2$	2°
IV.)	$\text{CH} \equiv \text{CH}$	2°
V.)	$\text{CH}_3 - \text{CH} \equiv \text{CH}$	2°
VI.)	 [cis isomer of alkene] $\text{CH}_3 - \text{CH} = \text{CH}_2$	1°
VII.)	 $[\text{CH}_3 - \text{C} = \text{C} - \text{CH}_3]$	1°
VIII.)		2°
IX.)		6°
X.)	 $[\text{C}_6\text{H}_5\text{Cl}]$	4°

$$D = \left[ n_C + 1 - \left( \frac{n_H + n_X - n_N}{2} \right) \right]$$

$n_C$  = no. of carbon  
 $n_X$  = no. of halogen  
 $n_N$  = no. of nitrogen  
 $n_H$  = no. of hydrogen

Q:2 <sup>bind.</sup> Degree of unsaturation on the basis of formulae



$$D = 8 - \frac{5 + 0 - 1}{2}$$

$$= 8 - \frac{4}{2} = 8 - 2 = 6$$

$$D = 3 - \frac{4 + 0 - 1}{2}$$

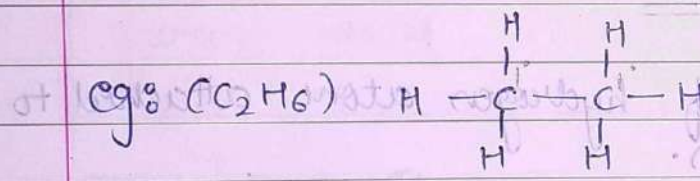
$$= 3 - \frac{3}{2} = 3 - 1.5 = 1.5$$

$$D = 8 - \frac{7 + 1 - 0}{2}$$

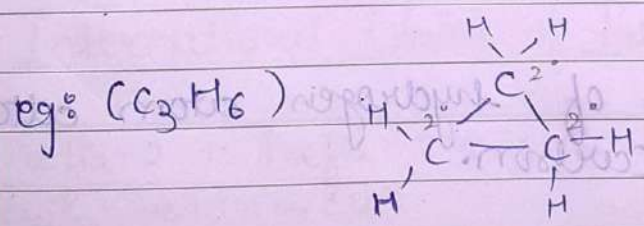
$$= 8 - \frac{8}{2} = 8 - 4 = 4$$

\* Degree of carbon:

1.) Primary or 1° Carbon: when carbon attached to single carbon atom.



2.) Secondary or 2° Carbon: when carbon attached to two carbon atom.



3.) Tertiary or 3° Carbon: when carbon attached to three carbon atom.

