Dipole Moment - I

Course on Chemical Bonding for Class XI 2023

Vishal joshi • Lesson 13 • Sept 9, 2021

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▲ 17 • Asked by Srijan Kum...

op sir

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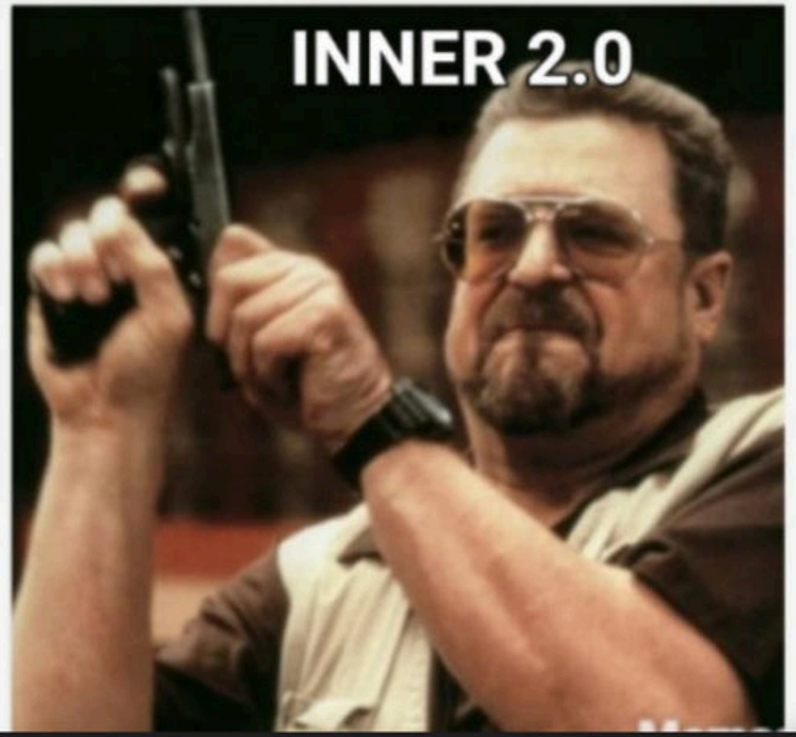
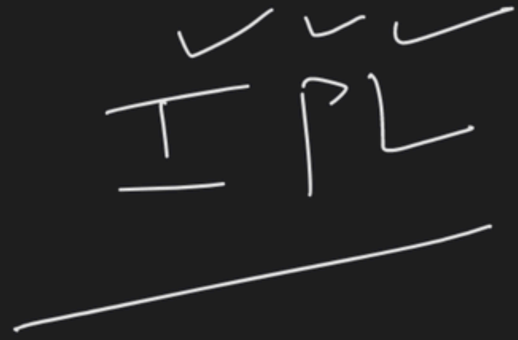
▲ 5 • Asked by Akash Shek...

Please help me with this doubt

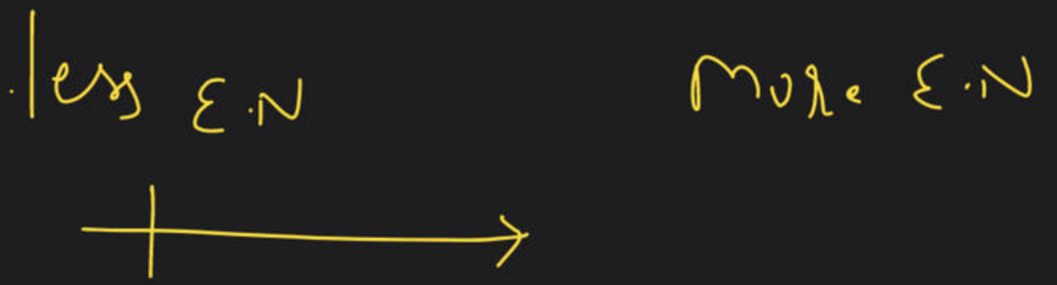
whenever someone on vc says sir doubt nhi hai aese hi raise hand kiya

outer vj sir:achaa....beta kaise ho aap.....





Dipole moment :→



or

$$\mu = e \times d \text{ esu} \times \underline{\text{cm}}$$

d = distance

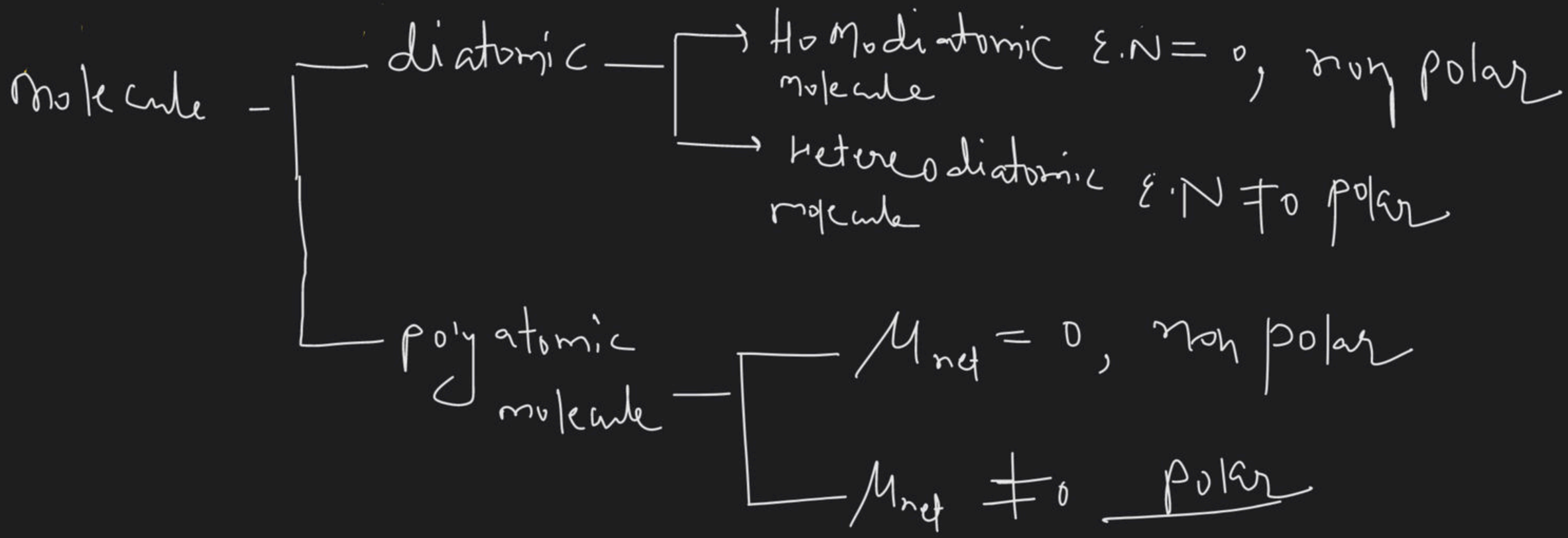
$e = 4.8 \times 10^{-10}$ e.s.u

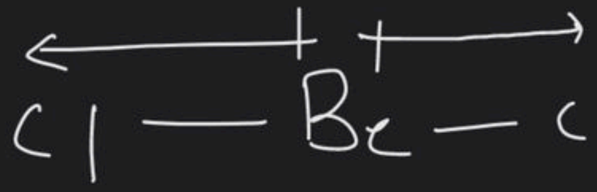
$= 1.6 \times 10^{-19}$ C

Unit = Debye

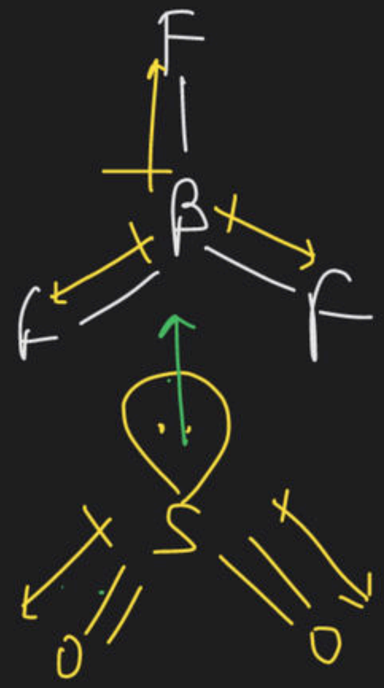
1 Debye $= 10^{-18}$ esu × cm

$= 3.33 \times 10^{-30}$ C · M


Molecule
diatomic
Homodiatomic molecule
E.N = 0, non polar
Heterodiatomic molecule
E.N ≠ 0 polar
polyatomic molecule
$\mu_{net} = 0$, non polar
$\mu_{net} \neq 0$ polar

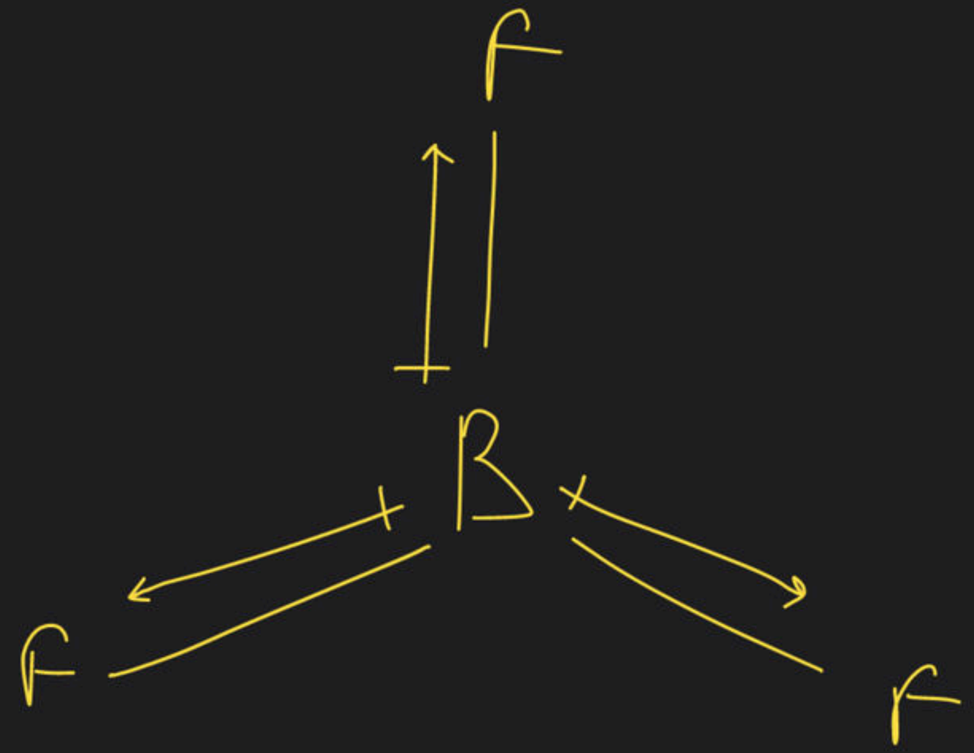


$\mu = 0$, non polar | Planar

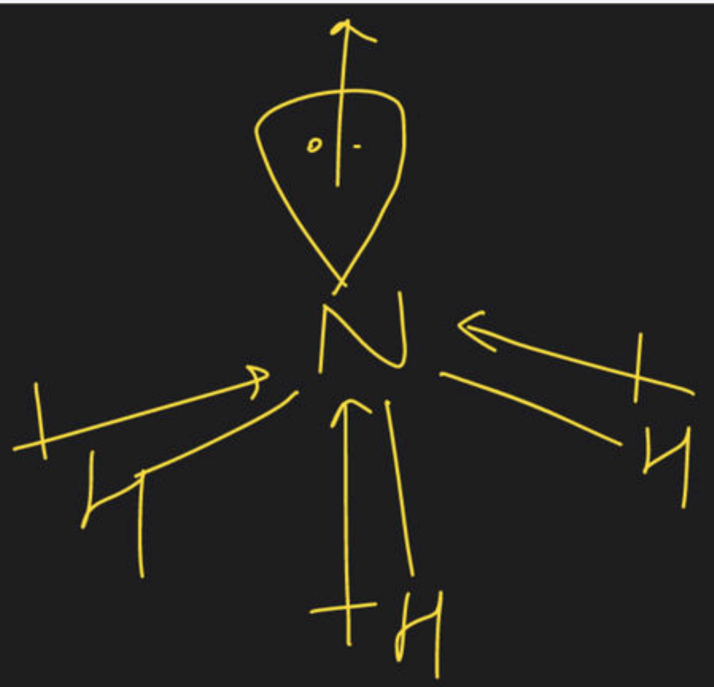


$\mu = 0$ non polar | Planar

$\mu \neq 0$ Polar | Planar



$\mu = 0$ nonpolar

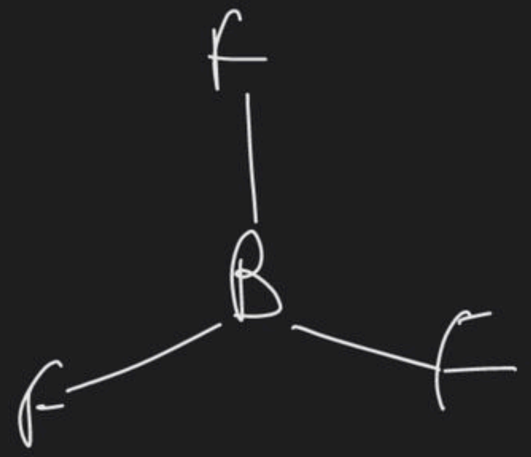


$\mu \neq 0$ Polar | non planar

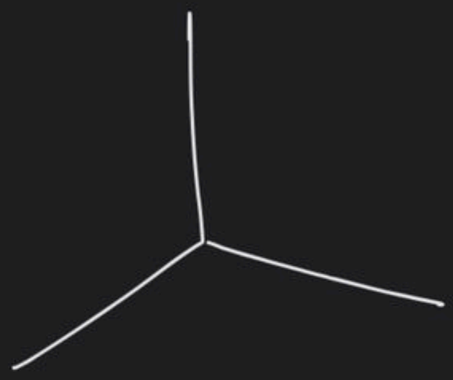
$\mu \neq 0$ Polar | Planar

Note: Vector dir of l.p away from the Central atom.

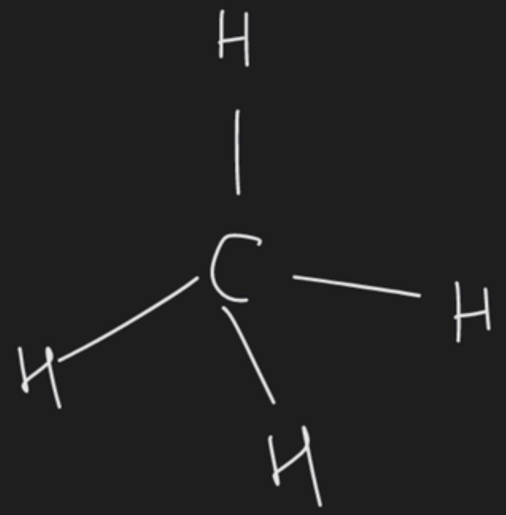
Cl — Be — Cl Planar



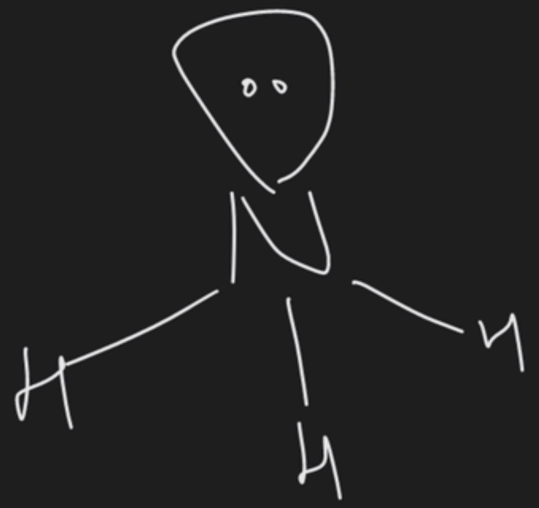
Planar



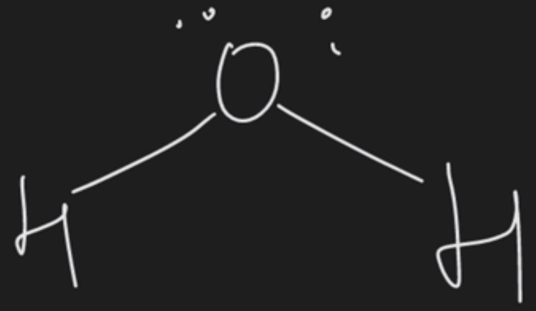
planar



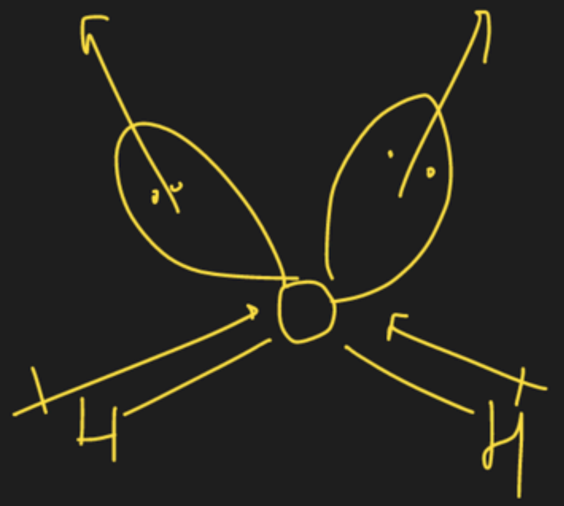
nonplanar



Non planar

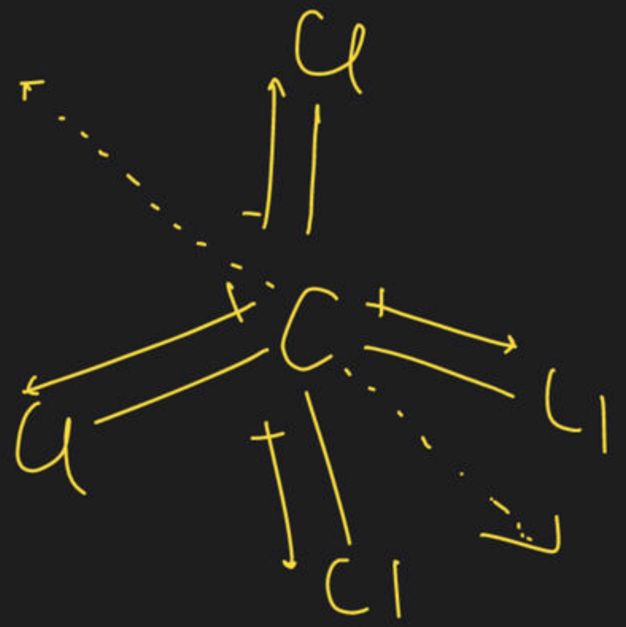


Planar



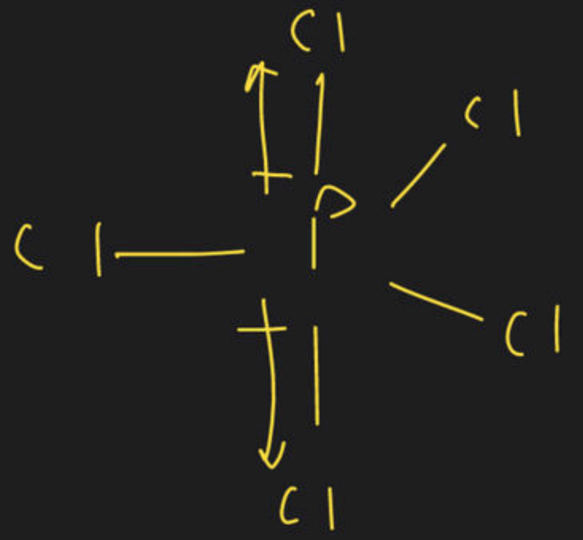
$M \neq 0$

Color



$\mu = 0$ non polar / non planar

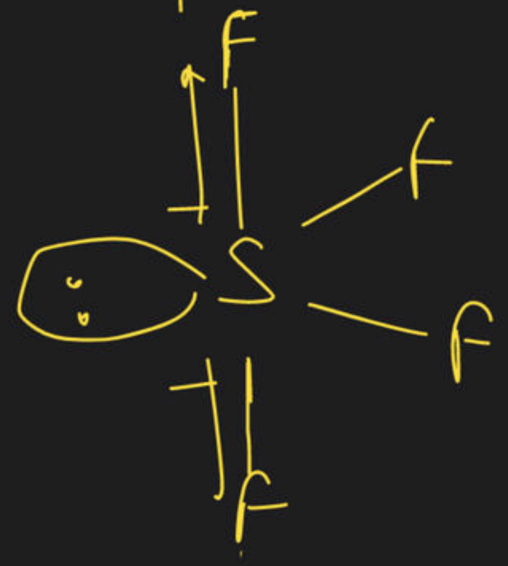
PCl_5 non planar



$\mu = 0$

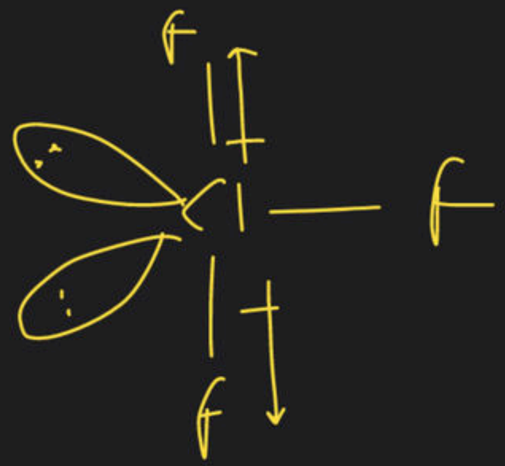
non polar

SF_4 (non planar)



$\mu \neq 0$ Polar

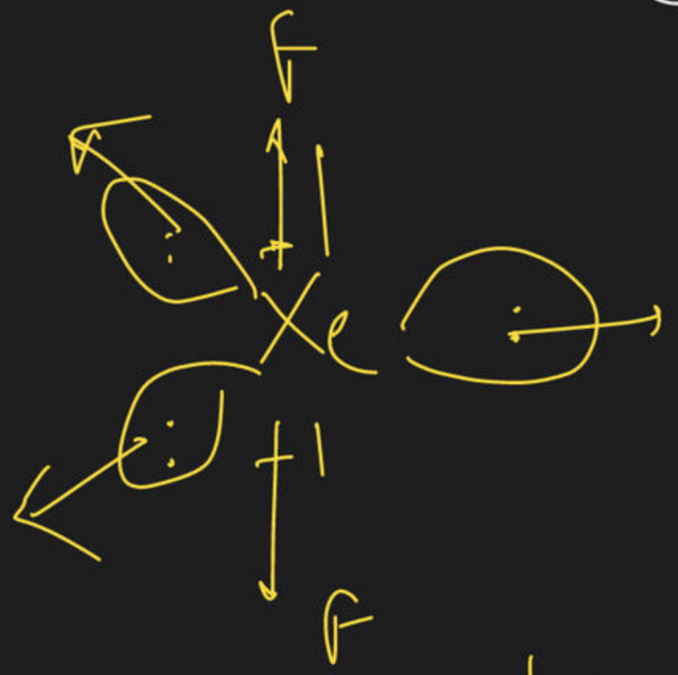
ClF_3 (Planar)



$\mu \neq 0$

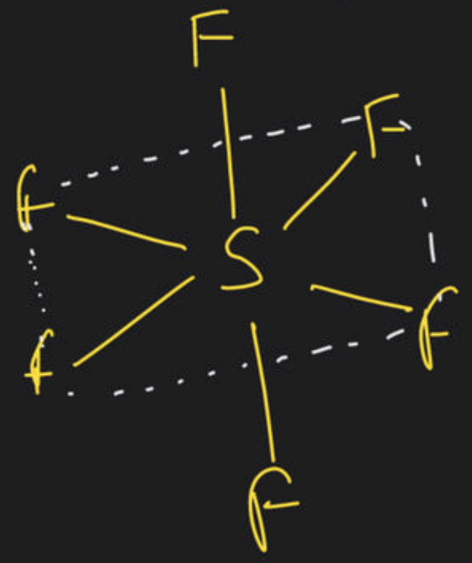
polar

XeF_2 (Planar)



$\mu = 0$ Nonpolar

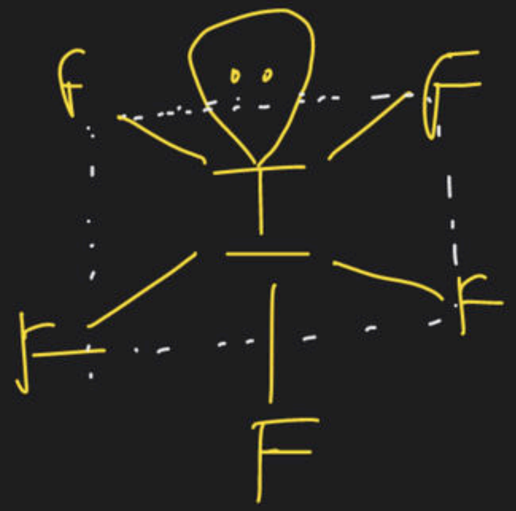
SF_6



Non Planar

$\mu = 0$ non polar

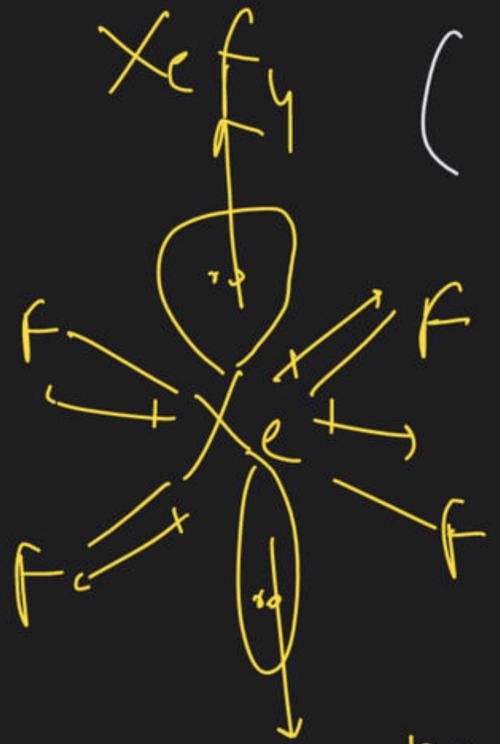
IF_5



non planar

$\mu \neq 0$

Polar



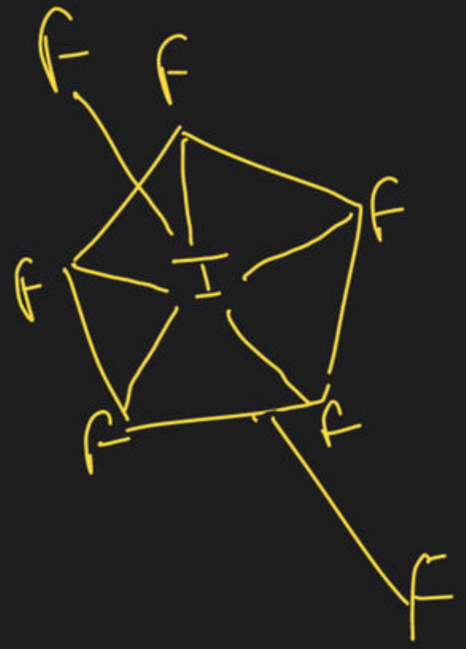
(Planar

$\mu = 0$, non polar

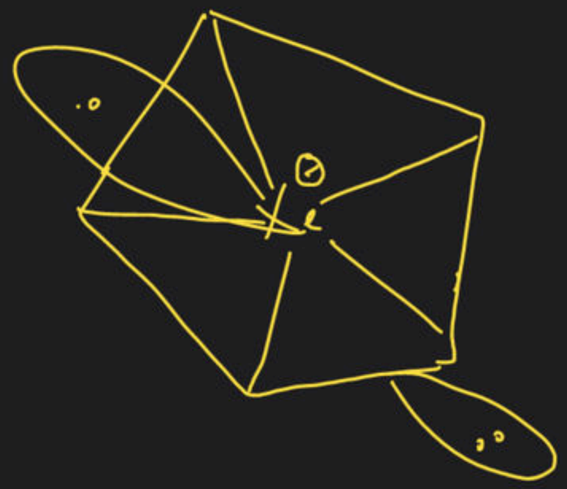
IF_7 (non planar)

$\mu = 0$

non polar



$XeF_5^{\ominus}$ (Planary



Non Polar

$\mu = 0$!

Qn1

Which of the following set of molecule are planar but diff in hyb.

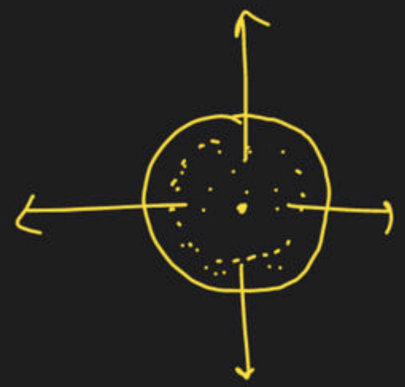
① H_2O (sp^3), BF_3 (sp^2)

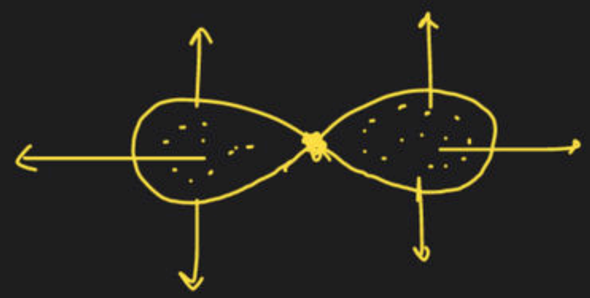
② XeF_4, IF_5

③ CH_4, NH_3

④ all

Note





dipole moment of pure orbital $= 0$

but dipole moment hyb. orbital $\neq 0$

Que Compare dipole moment of NF_3 and NH_3

(a) $NF_3 > NH_3$ (b) ~~$NH_3 > NF_3$~~

(c) $NH_3 = NF_3$ (d) none


N
H
H
H
>
N
F
F
F

Que Compare bond dipole moment of N-H and N-F bond

(a) N-H > N-F (b) ~~N-H < N-F~~

(c) N-H = N-F (d) none

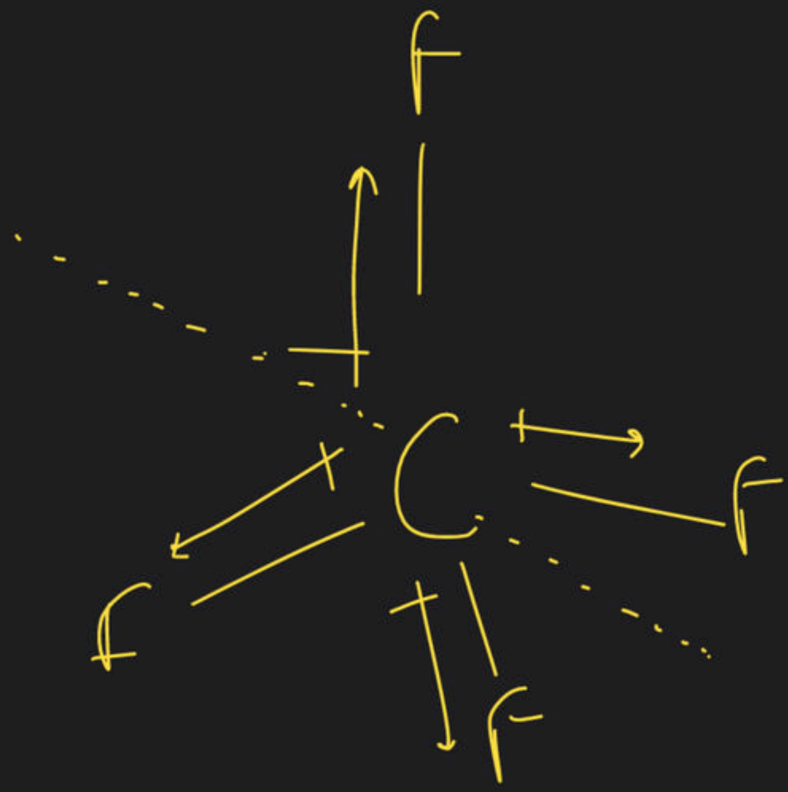
Bond dipole moment $\propto$ E.N diff.

E.N diff 0.9

$<$

1


F
B
F
F



$\mu = 0$

non polar

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▲ 4 • Asked by Ankitjha

Sir aapke liye