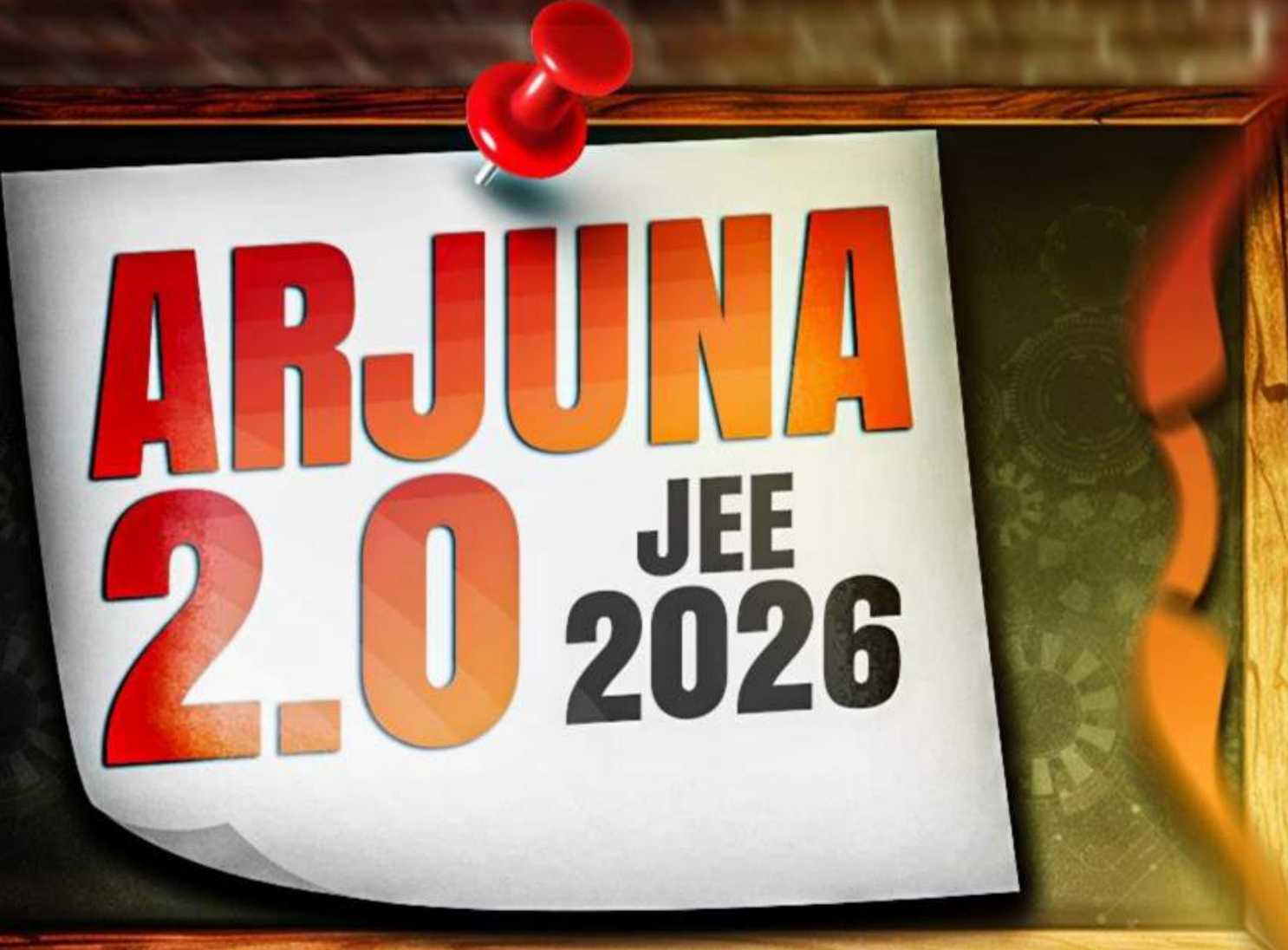


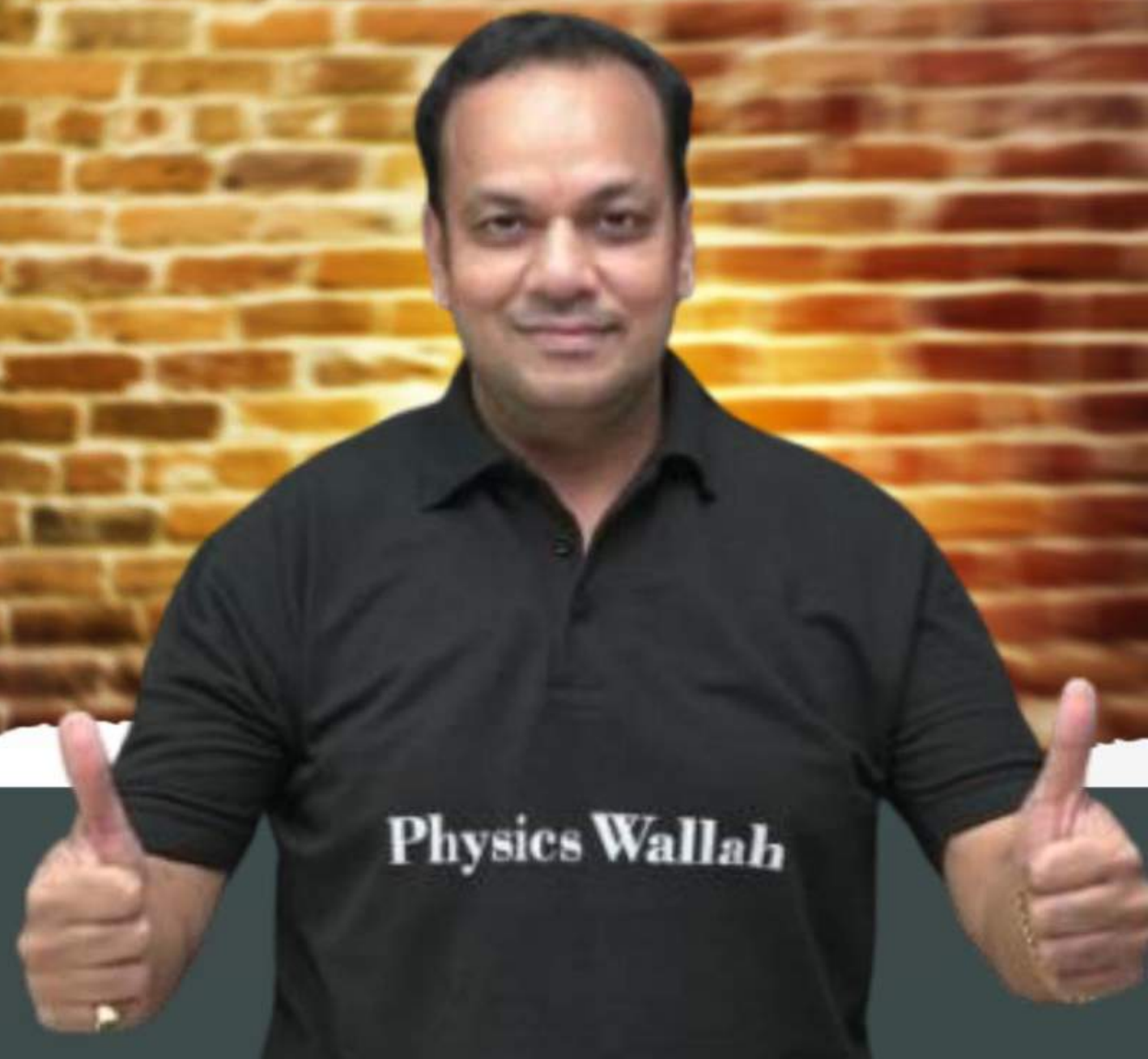


ARJUNA
2.0 **JEE**
2026

Chemical Bonding and Molecular Structure

Inorganic Chemistry Lecture – 10

By – Amitabh Sharma (ATS sir)



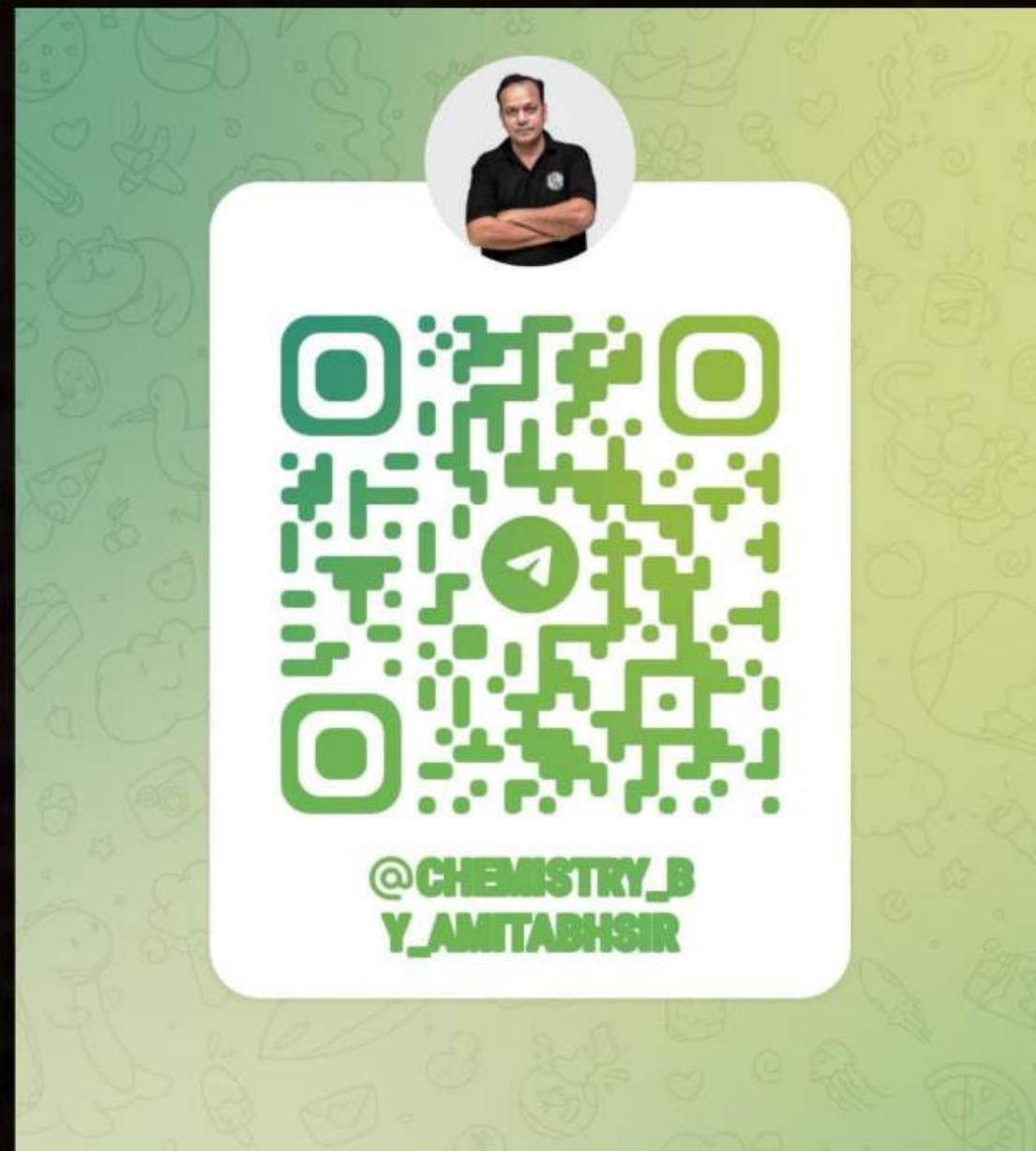
Physics Wallah



Topics to be covered

1

Hybridization



https://t.me/Chemistry_by_AmitabhSir

Aap selection ke saath rank bhi Lana chhate to ye sequence follow karne...

Perfect lecture sequence of chemical bonding...

- | | |
|-------------------------------------|-------------------------------|
| 1. Introduction of bond | 2. Octet rule |
| 3. Ionic bond | 4. Covalent bond |
| 5. Overlapping | 6. Coordinate bond |
| 7. Valency | 8. Lewis dot structure |
| 9. Hybridization | 10. Solid state hybridization |
| 11. Hybridization in odd e molecule | 12. VSEPR theory |
| 13. Bents rule | 14. Drago rule |
| 15. Back bonding | 16. Bridge bonding |
| 17. Oxi acid | 18. Molecule do not exist |
| 19. Hydrolysis | 20. Fajans rule |
| 21. MOT | 22. Hydrogen bonding |
| 23. Dipole moment | 24. Weak Force |

ATS-ANT TAK SAATH



Hello IITian
Lala Lali

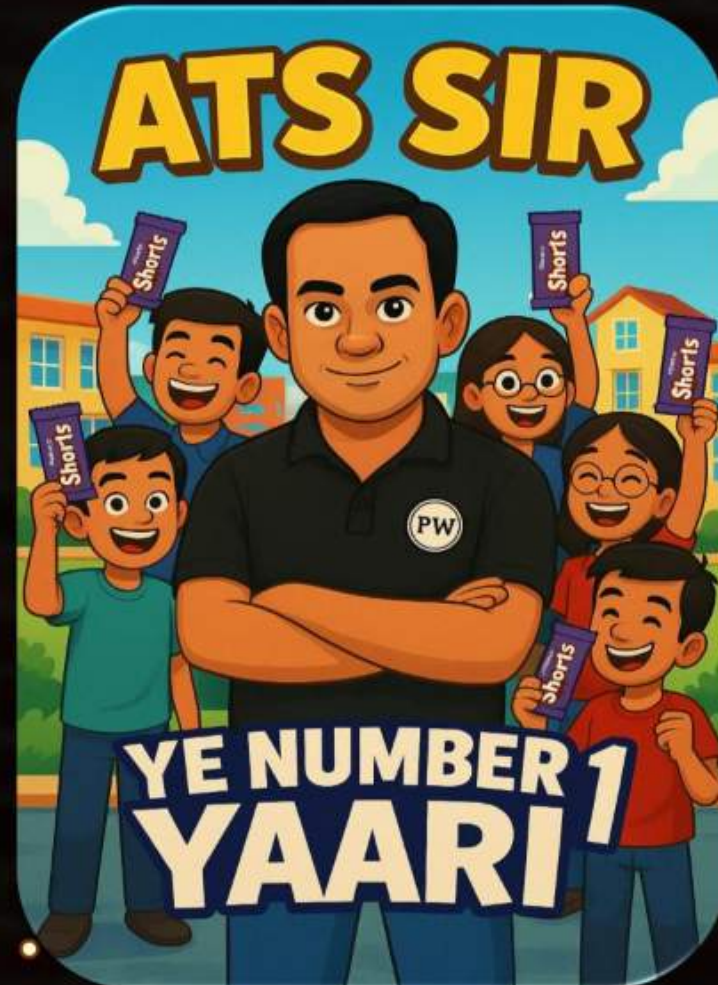
IOC samjhne ka nahi,
Feel karne ka kaaa...!!

Love u Gucchu
Pucchu

Ready for
Shots pe shots
challenge

By the end
summary is
this

ATS-ANT
TAK SAATH

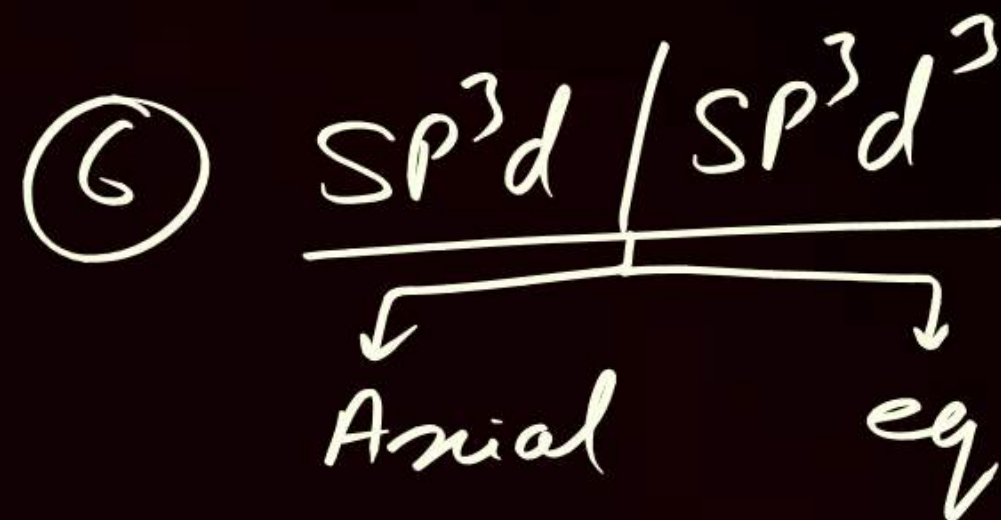


Paneer Gang

ATS Army

Total Recall

- ① $SN \Rightarrow BP + l.p$
- ② $BP + l.p \Rightarrow \text{no of } H.O$
- ③ $\text{No of } H.O \rightarrow Hyb^n$
- ④ $e^- \text{ pair} \begin{cases} \rightarrow BP \\ \rightarrow l.p \end{cases} \begin{cases} \rightarrow \sigma \\ \rightarrow \pi \end{cases}$
- ⑤ $Hyb^n \rightarrow \sigma + l.p$



- | | |
|---------------------------------------|--|
| 1. Hybridization of central atom | 2. Shape or Geometry of molecule |
| 3. Electron pair geometry of molecule | 4. No. of σ and π |
| 5. Ratio of σ and π | 6. No. of lone pair (C.A. or S.A.) |
| 7. Ratio of bond pair and lone pair | 8. No. of RS |
| 9. Bond order | 10. Formal charge |
| 11. Type of bond angle | 12. No. of bond angle |
| 13. State of central atom (GS or ES) | 14. Coordinate bond (Present/Absent) |
| 15. Type of coordinate bond | 16. Planar or non-planar |
| 17. Max. no. of atom in one plane | 18. No. of plane in which Max. no. of atom |
| 19. No. of B.P.-B.P. repulsion | 20. No. of L.P.-L.P. repulsion |
| 21. No. of B.P.-L.P. repulsion | 22. Oxidation state of central atom |
| 23. No. of $p\pi$ - $p\pi$ bond | 24. No. of $p\pi$ - $d\pi$ bond |

sp

CO₂



$$S.N \quad 2 \times 5 + 0 \times 1 \cdot P = 2$$



1. Hybridization *sp*

2. Geometry/Shape *linear*

3. Bond Angle *180°*

4. No. of RS *3*

5. Bond order *2*



$$\frac{2 + 1 + 3}{3} = \frac{6}{3}$$

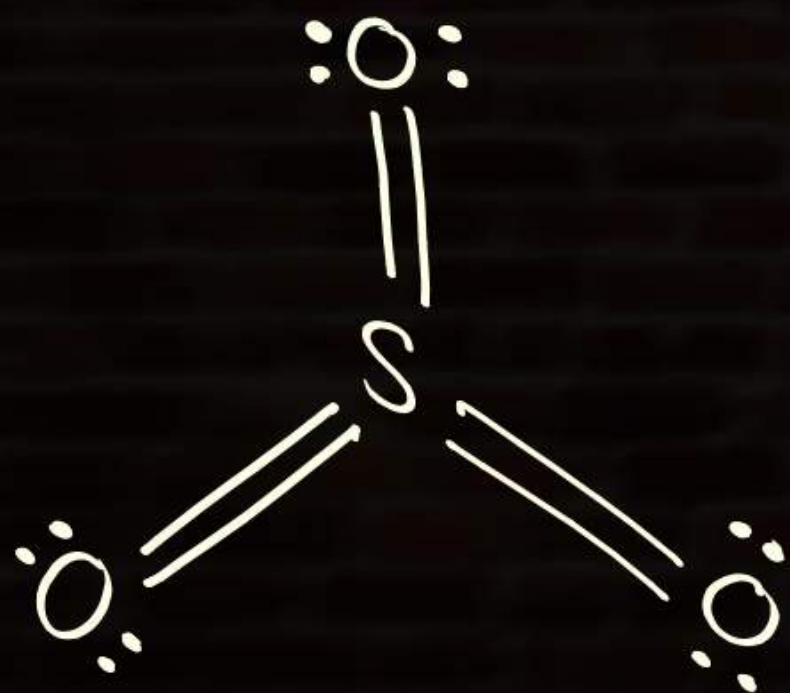
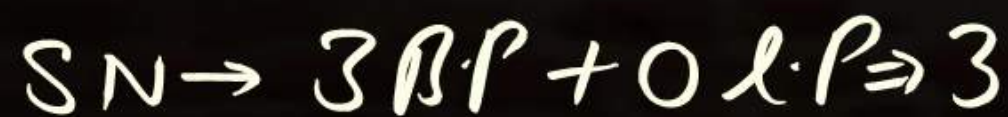
sp

CO



$$SN \Rightarrow 1 \text{ BP} + 1 \text{ LP} = 2$$

1. Hybridization sp 2. Geometry/Shape *linear*3. Bond Angle *N.A*4. Bond order 3 5. Type of COB π

sp^2 SO_3 

1. Hybridization

 sp^2

⑦ no of plane. ①

2. Geometry/Shape

T.P

3. Bond Angle

 $120(3)$

4. Bond order

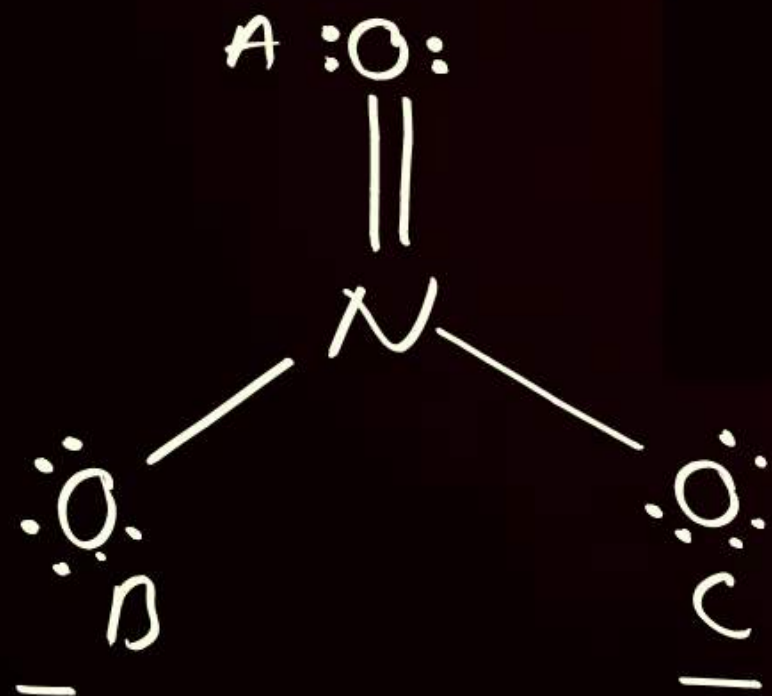
2

⑤ Planar

⑥ Max no of atoms in one plane. $\rightarrow 4$



$$\text{S.N} \rightarrow 3\sigma + 0\text{L.P} \Rightarrow 3$$



$$\textcircled{1} \text{Hyb}^n \rightarrow \text{sp}^2$$

$$\textcircled{2} \text{Geo/Shape} \rightarrow \text{T.P}$$

$$\textcircled{3} \text{FC} \quad \text{N} \rightarrow \cancel{+1}$$

$$\text{O}_A \rightarrow 0$$

$$\text{O}_B \rightarrow \cancel{-1}$$

$$\text{O}_C \rightarrow \textcircled{-1}$$

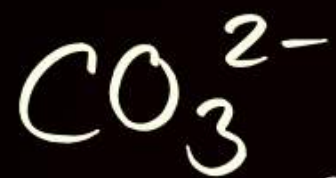
$$\textcircled{4} \text{RS} \rightarrow 3$$

$$\textcircled{5} \text{Bo} \rightarrow 1.33$$

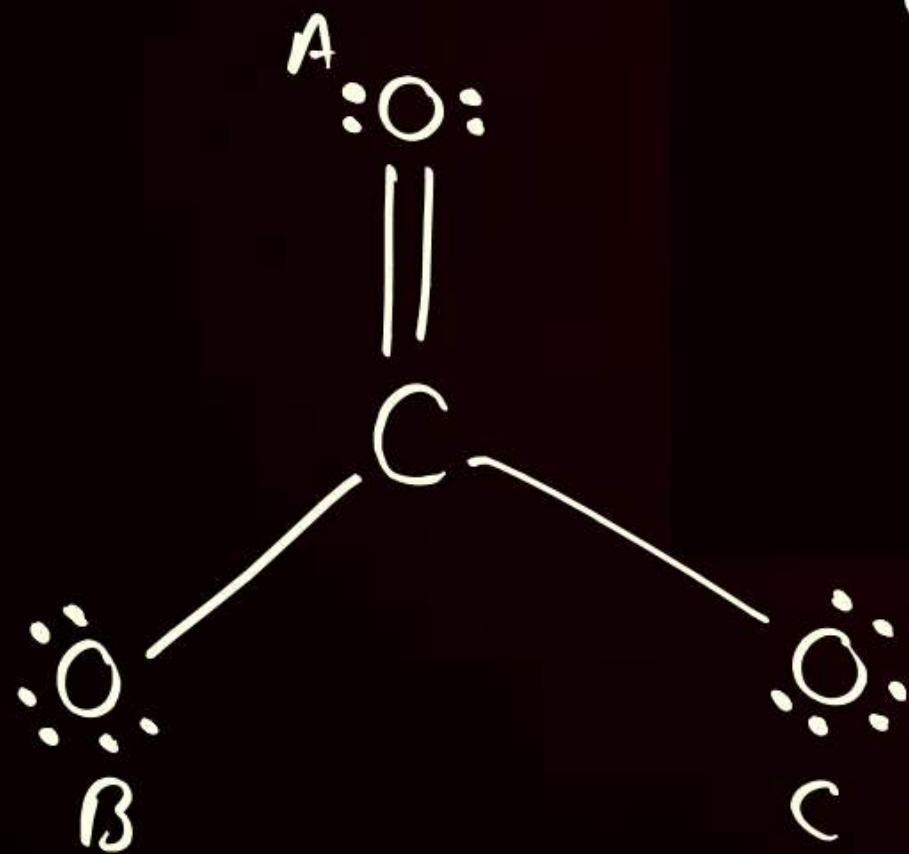
Trick

no of Single
Bond 'O' atoms
(=)

no of (-)ve
Charge



3σ + 0 l.p



① Hybrid $\rightarrow \text{sp}^2$

② Geo/Shape $\rightarrow \text{T.P}$

③ F.C $\text{C} \rightarrow 0$

$\text{O}_A \rightarrow 0$

$\text{O}_B \rightarrow -1$

$\text{O}_C \rightarrow -1$

sp^2
 SO_2


$$2\sigma + 1 \text{ l.p.} \rightarrow 3$$



1. Hybridization sp^2

2. Geometry/Shape *V-Shape / Bent / Angular*

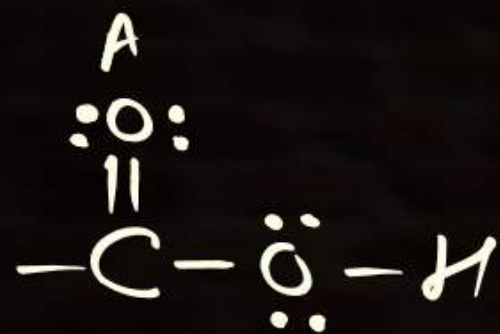
3. Bond Angle $\Theta < 120^\circ$

4. Bond order 2

⑤ *Planar*

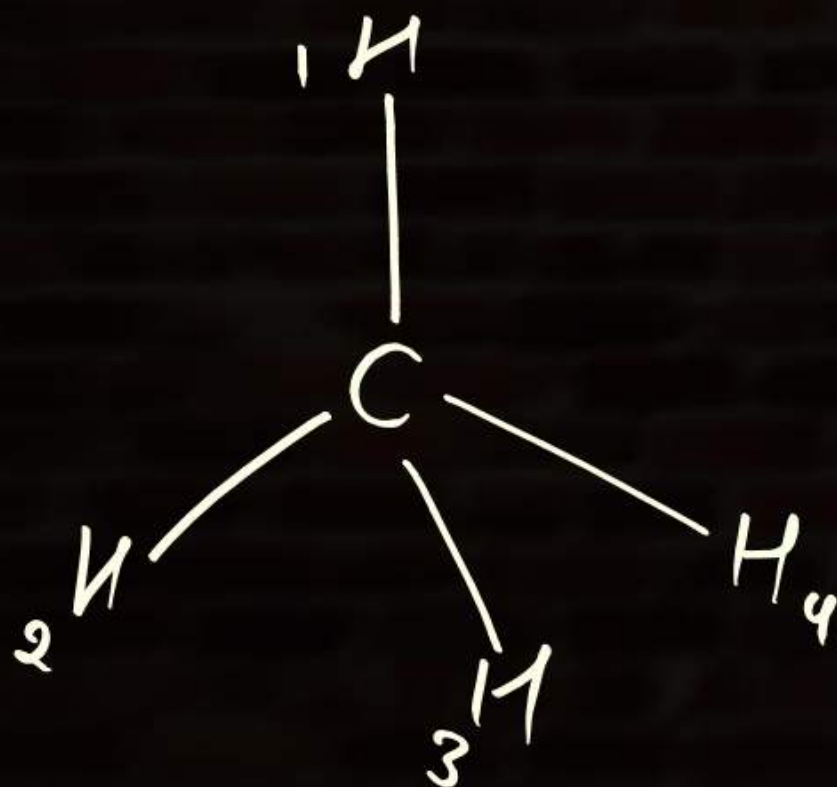
sp^2

COOH

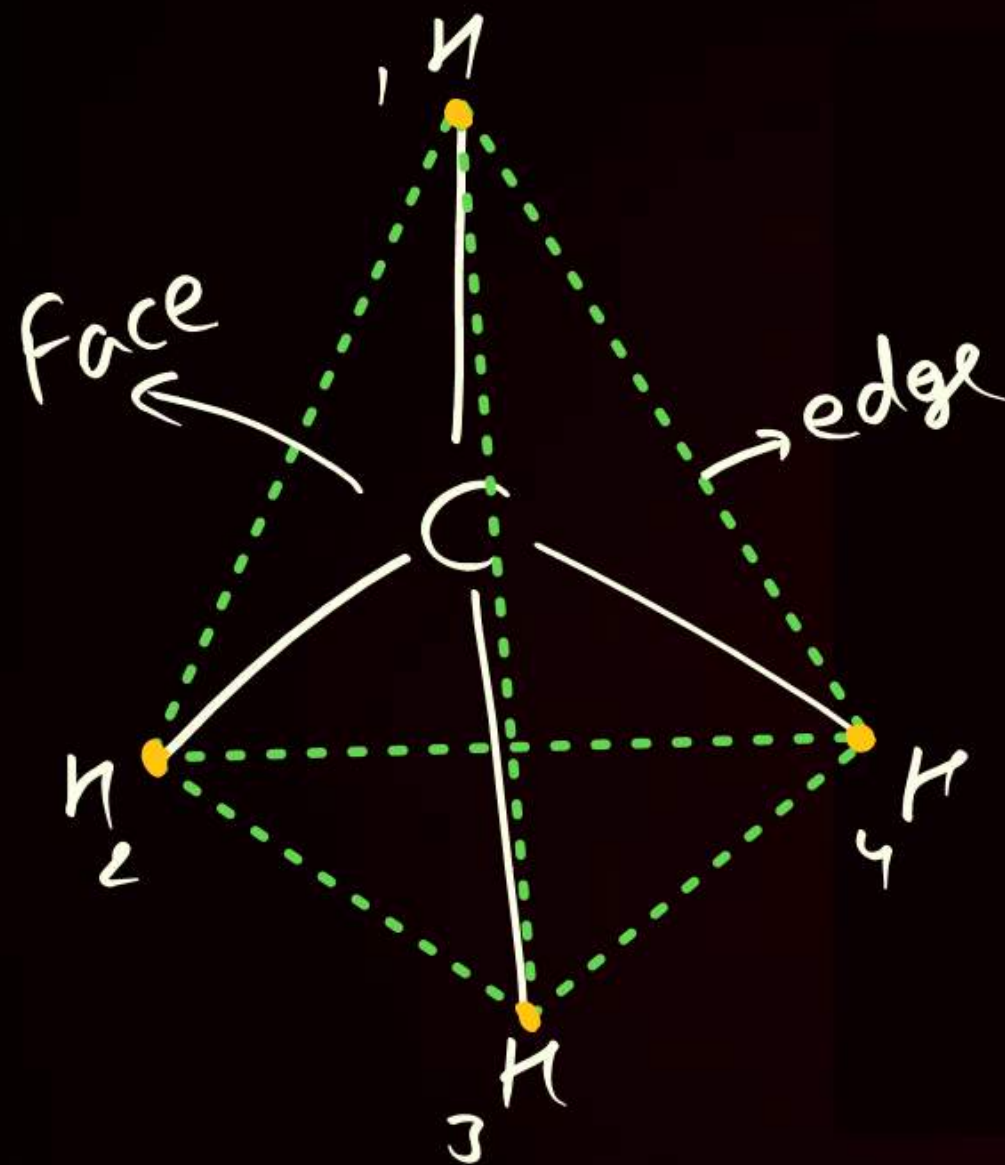


1. Hybridization on O atom sp^2

$$O_A \rightarrow 1\sigma + 2\text{LP} = 3$$

sp^3 CH_4  $4\sigma + 0l.p$ 

1. Hybridization sp^3
2. Geometry/Shape *Tetrahedral*
3. Bond Angle $109(6)$
4. Bond order 1
5. Max. no. of atoms in one plane 3
6. No. of planes in which max. no. of atoms 10



$$\textcircled{1} \Theta \rightarrow 109(6)$$

$1-C-2$
 $1-C-3$
 $1-C-4$
 $2-C-3$
 $2-C-4$
 $3-C-4$

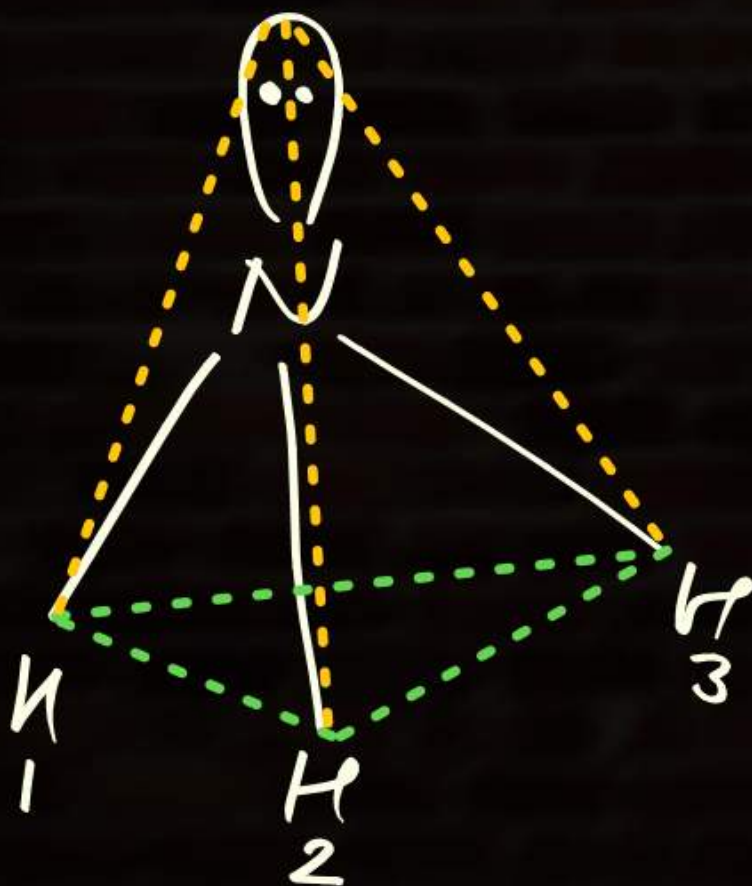
$\textcircled{6}$
 edge

$\textcircled{10}$

$1-2-3$
 $1-3-4$
 $1-4-2$
 $2-3-4$

$\textcircled{4}$
 face

sp^3
$$\text{NH}_3$$

$$3BP + 1LP \rightarrow 4$$


1. Hybridization

 sp^3

★ 2. Geometry/Shape
only BP

Py

★ 3. Electron pair geometry
BP + LP

Tetrahedral

4. Bond Angle $\theta < 109$

5. Max. no. of atoms in one plane 3

6. No. of planes in which max. no. of atoms

⑦ Non-planar

edge

1-N-2

1-N-3

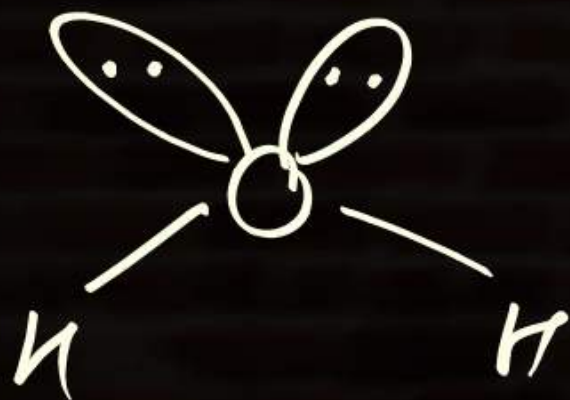
2-N-3

~~1-2-3~~

face

sp^3 H_2O 

$$2\sigma + 2l.p \Rightarrow 4$$

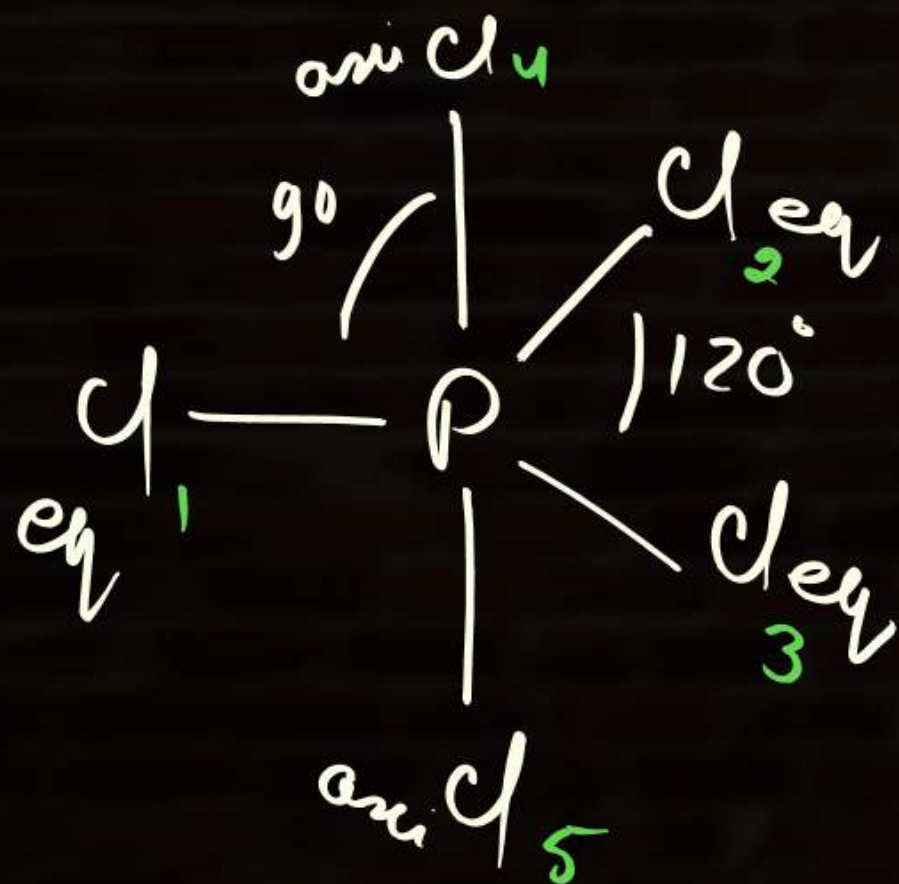
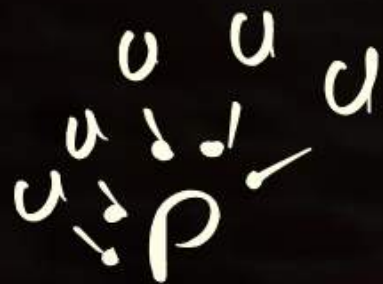


1. Hybridization sp^3

2. Geometry/Shape V -Shape

3. Bond Angle $\Theta < < 109$

(4) Planes

sp^3d
 PCl_5


1. Hybridization sp^3d

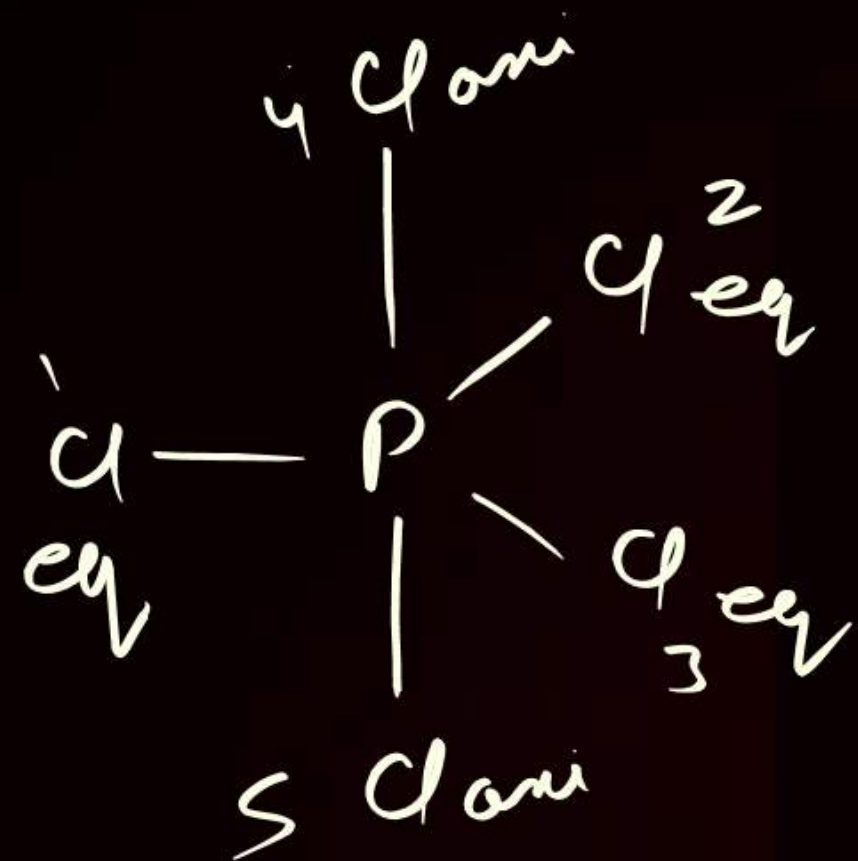
2. Geometry/Shape T.B.P

3. Bond Angle

$\nearrow$	90	$\rightarrow$	axi-eq	6
$\rightarrow$	120	$\rightarrow$	eq-eq	3
$\searrow$	180			

4. Max. no. of atoms in one plane 4

5. No. of planes in which max. no. of atoms 4



no of plane $\rightarrow$ (4)

$$3eq + C.A \rightarrow 1$$

$$2am + 1eq + CA \rightarrow 3$$

sp^3d

SF_4

1. Hybridization
2. Geometry/Shape
3. Bond Angle

sp^3d

ClF_3

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Planarity
5. Max. no. of atoms in one plane

sp^3d

I_3^-

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane

sp^3d^2

SF_6

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane
5. No. of planes in which max. no. of atoms

sp^3d^2

BrF_5

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane
5. No. of planes in which max. no. of atoms

sp^3d^2

XeF_4

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane
5. No. of planes in which max. no. of atoms

sp^3d^3

IF_7

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane
5. No. of planes in which max. no. of atoms

sp^3d^3

XeF_6

1. Hybridization

2. Geometry/Shape

sp^3d^3

XeF_5^-

1. Hybridization
2. Geometry/Shape
3. Bond Angle
4. Max. no. of atoms in one plane
5. No. of planes in which max. no. of atoms

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10:00

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Attempt

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Attempt

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Basic Maths and Calculus :

**THANK
YOU**