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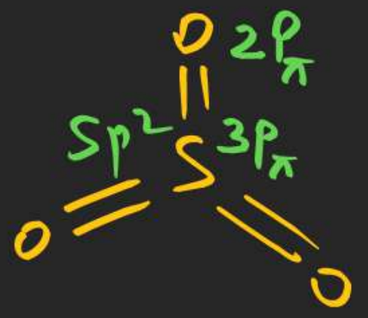
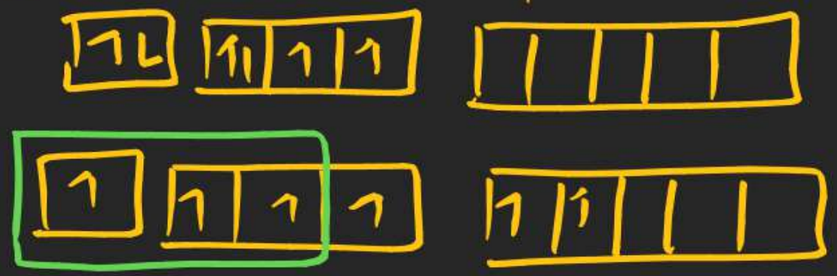
Find the number of $d_\pi - p_\pi$ bond in SO_3



S = $3s^2$ $3p^4$ $3d$



one → $2p_\pi - 3p_\pi$

two → $3d_\pi - 2p_\pi$

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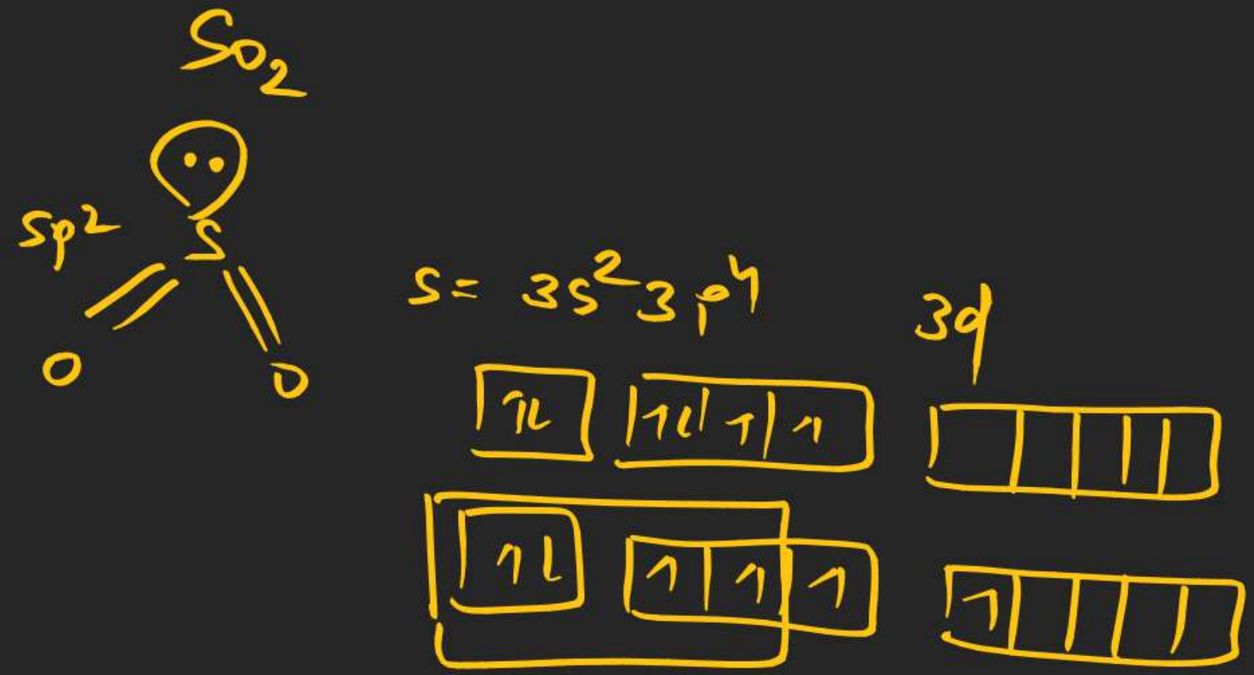

One → $3p_\pi - 2p_\pi$

One → $3d_\pi - 2p_\pi$

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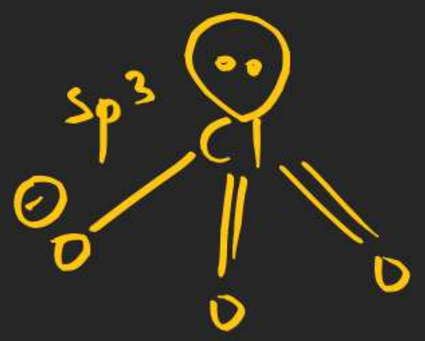
ClO_3^-



$Cl = 3s^2 3p^5 \quad 3d$

two = $3d_\pi - p_\pi$

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ClO_4^-

Cl :- $3s^2\ 3p^5$ 3d

three → $3d_{\uparrow} - 2p_{\uparrow}$

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Chemical bonding

EXERCISE # 3

1. Find total number of orbitals in which electron density is observed along any of the axis $(x, y \text{ or } z)$.

$$p_x, p_y, p_z, d_{xy}, d_{xz}, d_{yz}, d_{z^2}, d_{x^2-y^2}$$

(5)

d_{z^2}

$d_{x^2-y^2}$

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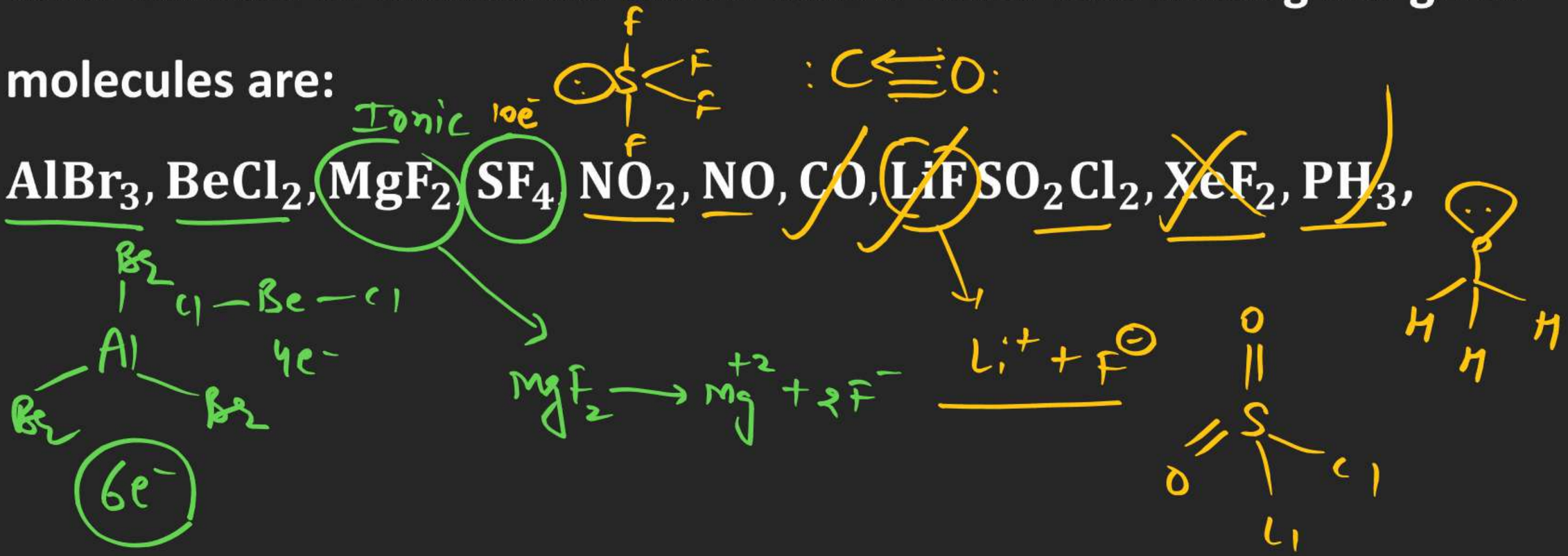
Chemical bonding

EXERCISE # 3

2. Total number of molecules which follow octet rule among the given molecules are:

$AlBr_3$, $BeCl_2$, MgF_2, SF_4, NO_2, NO, CO, LiF SO_2Cl_2, XeF_2, PH_3,



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S-Block and NH_4^+ → Ionic Compound

Except $LiX \mid MgX_2 \mid AlX_3 \Rightarrow$ Predom. Covalent

(X = Cl 或 I)

$LiF \mid MgF_2 \mid AlF_3 \Rightarrow$ Predom Ionic

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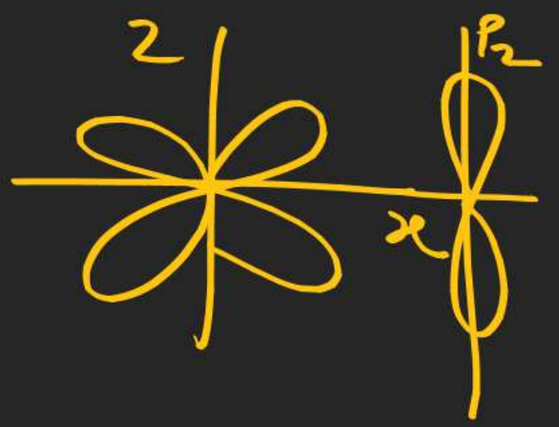
Chemical bonding

EXERCISE # 3

3. The number of set of orbitals given below forming π-bonds are ?

	Orbitals		Inter Nuclear Axis
(1)	$p_x + p_y$	–	x
(2)	$p_z + p_z$	–	y
(3)	$d_{xy} + d_{xy}$	–	z
(4)	$d_{yz} + d_{yz}$	–	z
(5)	$d_{yz} + p_z$	–	z
(6)	$d_{xz} + p_z$	–	x
(7)	$d_{x^2-y^2} + p_y$	–	x



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Chemical bonding

EXERCISE # 3

4. Number of orbitals which can form π bond with p_x orbital on y-axis :

d_{z^2}, d_{xy}, p_x, p_z, s, $d_{x^2-y^2}$, d_{xz}

(2)

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Chemical bonding

EXERCISE # 3

5. Atomicity of O, S, P and He are p, q, r & s respectively : Calculate the value of $p + q + r + s$?

[Write your answer as sum of digits till you get the single digit answer]

15

$= 1+5$

$= 6$

O_2 P_4 S_8

$2+4+8+1$

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Chemical bonding

EXERCISE # 3

Note ⇒ B.O is zero then molecule not exist example Be_2 = B.O = 0

6. How many sets of given orbitals can form π bond ?

(z - axis is internuclear axis)

He_2, Ne_2 So they donot exist

$p_x + p_y$, $p_y + p_y$, $p_z + p_x$, $p_z + p_z$, $d_{x^2-y^2} + d_{z^2}$, $p_z + dxy$, $p_z +$ d_{xz}, $p_z + d_{yz}$, $d_{xz} + d_{yz}$, $d_{yz} + d_{yz}$, $d_{xy} + d_{xy}$, $d_{xy} + d_{x^2-y^2}$

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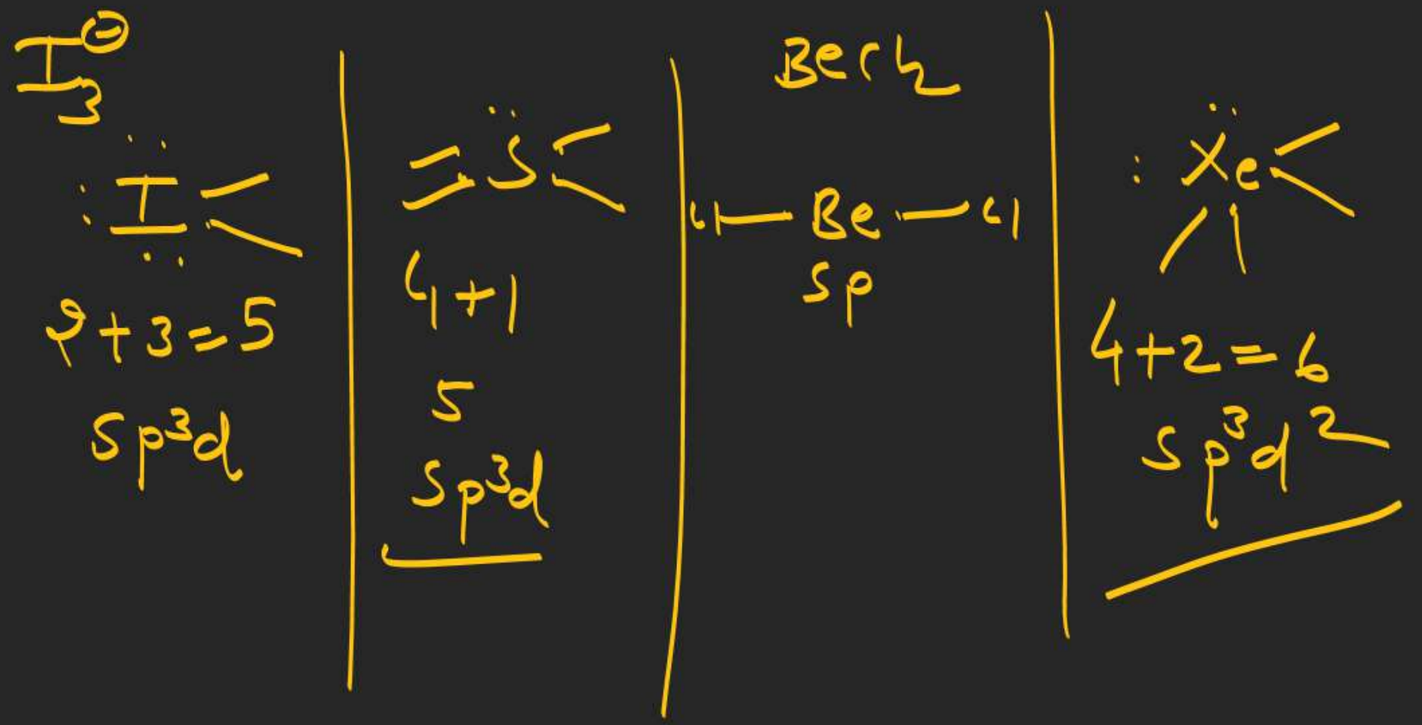
Chemical bonding

EXERCISE # 3

7. Find the number of molecules having sp^3d hybridization

I_3^-, SF_4, $BeCl_2$, XeF_4

(2)



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Chemical bonding

EXERCISE # 3

8. Find out the number of species which have at least one atom is sp^3d hybridised among the following :-

$O_3, O_2F_2, I_3^-, I(CN)_2^-, PF_3Cl_2, XeF_6, IOF_5, XeF_5^+$

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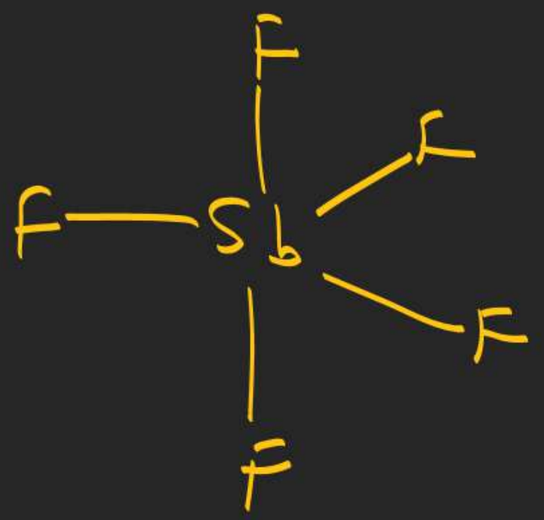
Chemical bonding

EXERCISE # 3

9. The number of planes of symmetry in SbF_5 is –

(4)



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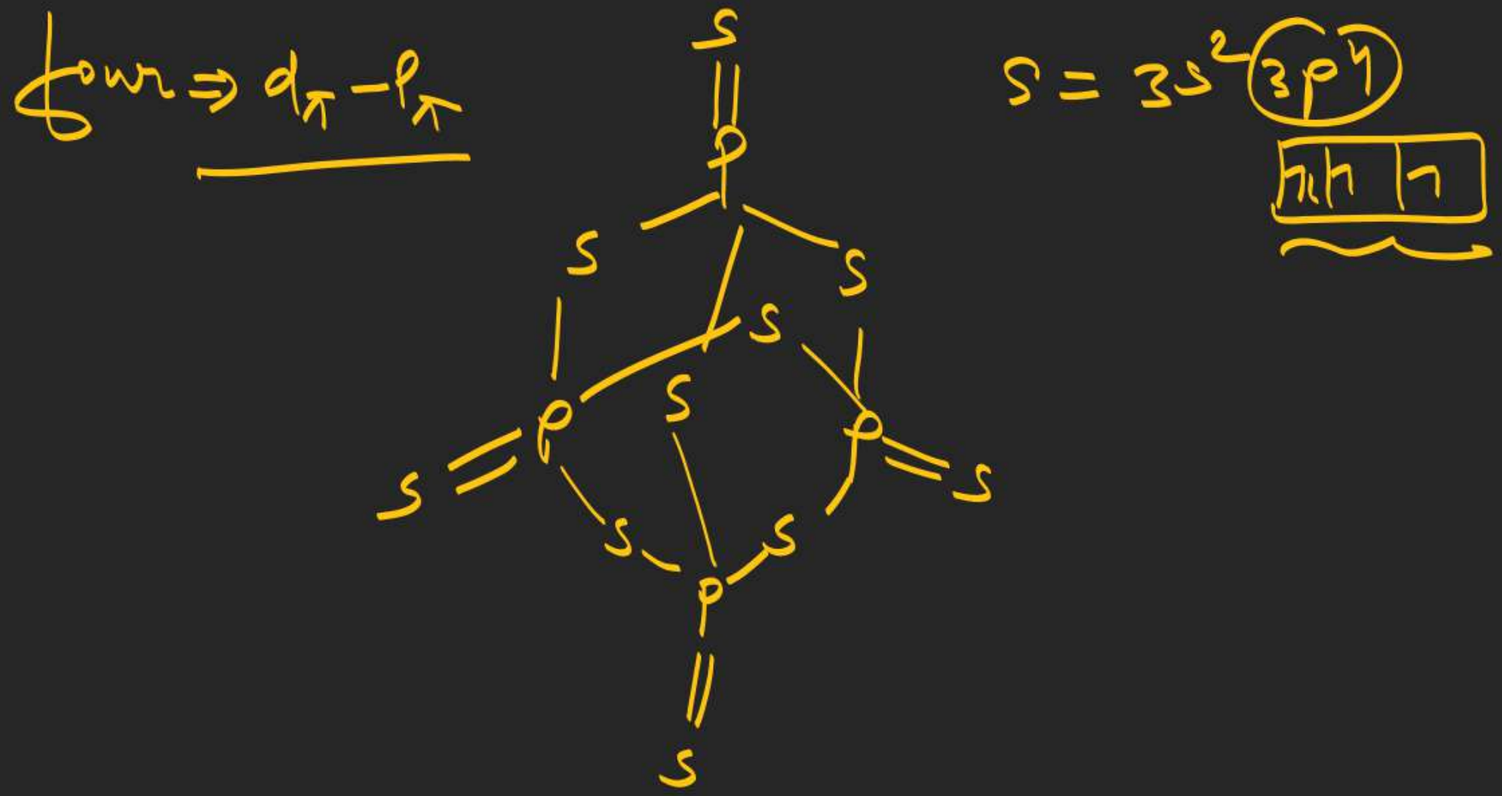
Chemical bonding

EXERCISE # 3

10. Find the number of $p\pi - d\pi$ bonds present in $P_4 S_{10}$



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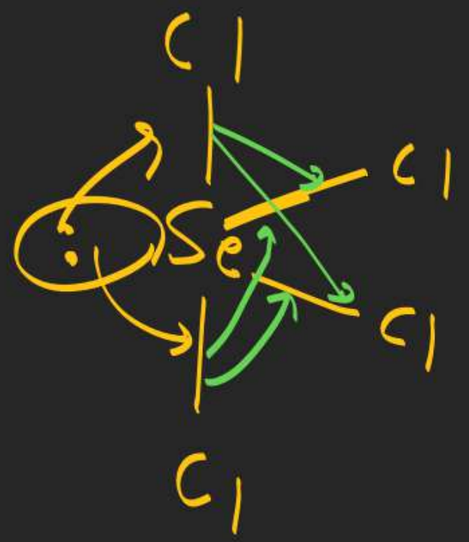
Chemical bonding

EXERCISE # 3

11. Total number of angle(s) in $SeCl_4$ which are less than 90°

(4)



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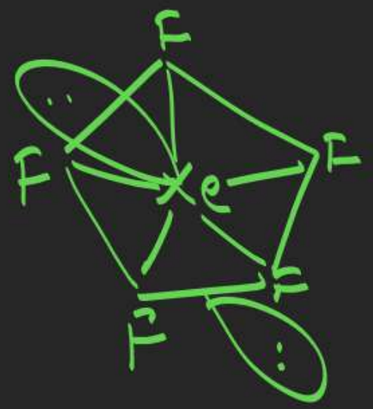
Chemical bonding

EXERCISE # 3

12. Number of molecules having all bond angles equal are ?

CH_2F_2, BHF_2, NF_3, XeF_5^-

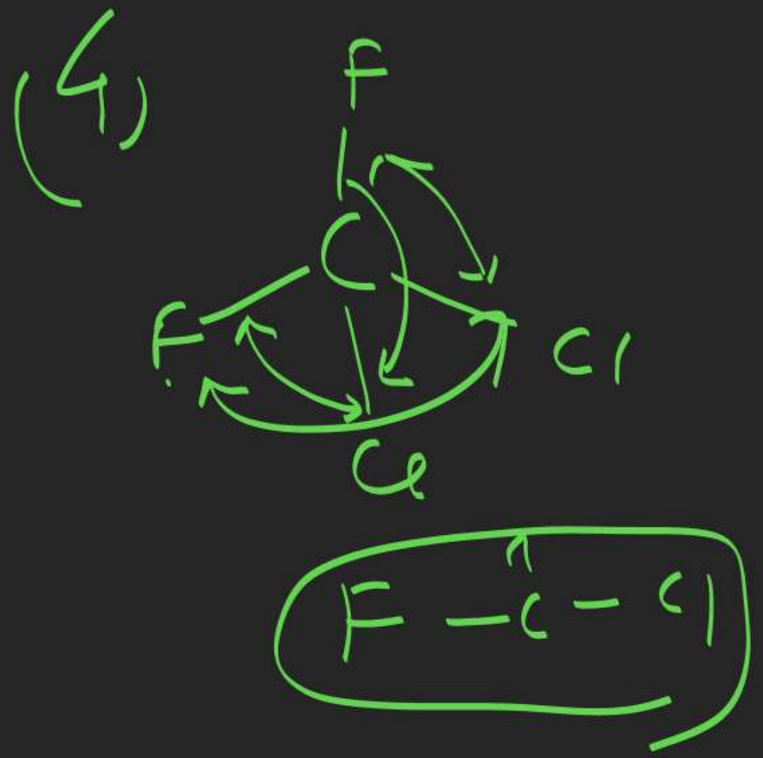
(2)



Chemical bonding

EXERCISE # 3

13. Total number of identical bond angle in CF_2Cl_2 is –



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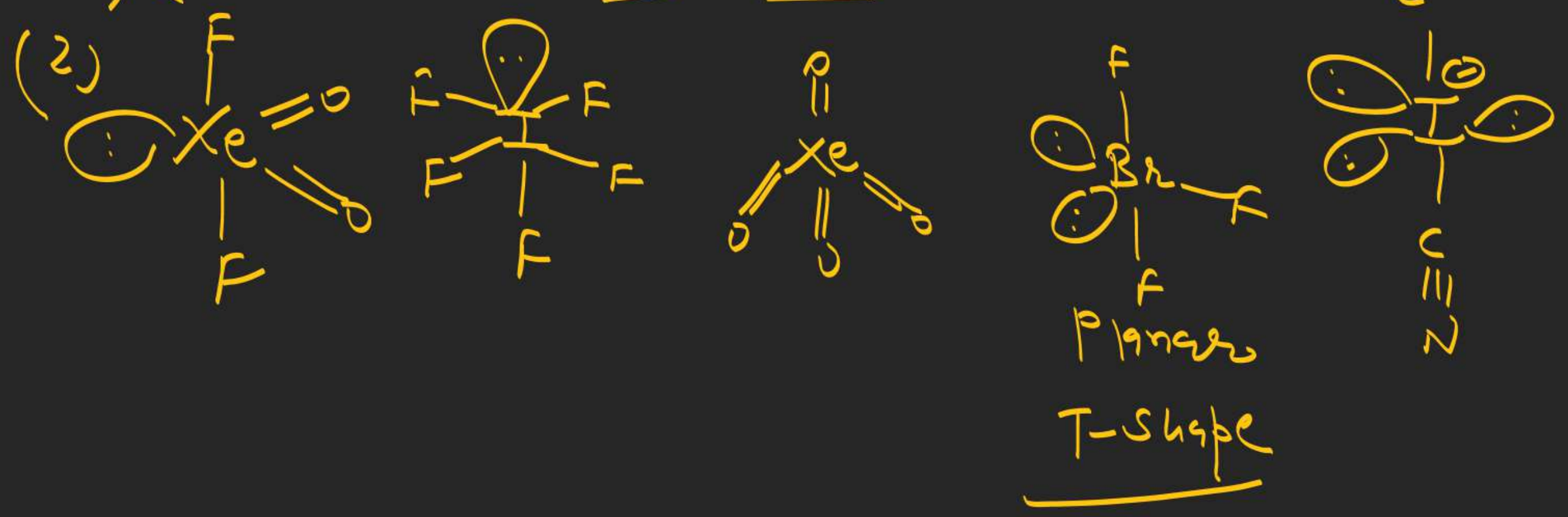
Chemical bonding

EXERCISE # 3

14. How many of the following are planar molecules/ions

$XeO_2\ F_2, IF_5, XeO_4, BrF_3, I(CN)_2^-$



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Chemical bonding

EXERCISE # 3

15. Total number of molecules which contain any $F - \hat{X} - F$ bond angle which is less than 90° ?

(X = Central atom)

IF_7, BrF_3, PF_5, SF_4, $XeOF_4$, SF_6