Nishant Jindal

Chemical bonding

31. Hybridisation of N in NO_2 is ?

(A) sp^3 (B) sp

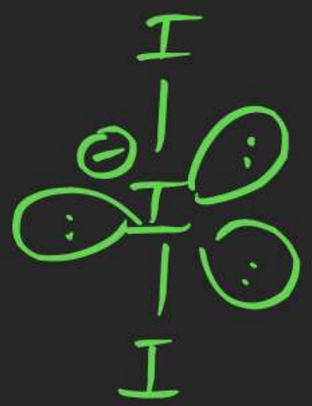
(C) sp^2 (D) N atom is unhybridized

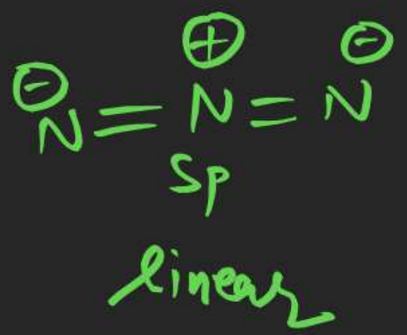
Odd e⁻ present at high energy level so it doesnot involve in Hyb. but if surrounding atom is more E.N then it develop partial positive Charge on central atom so orbital contracts towards central atom and involve in Hyb.

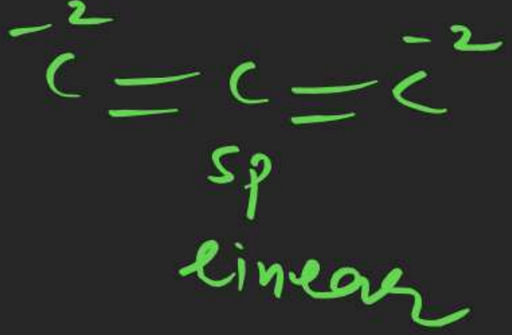
Chemical bonding

32. Which one is only V-shaped molecule or ion-

(A) I_3^- (B) N_3^- (C) S_3 (D) C_3^{4-}



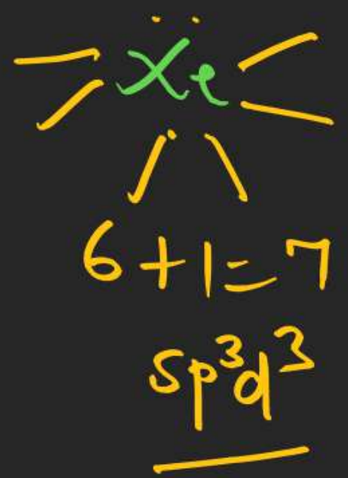


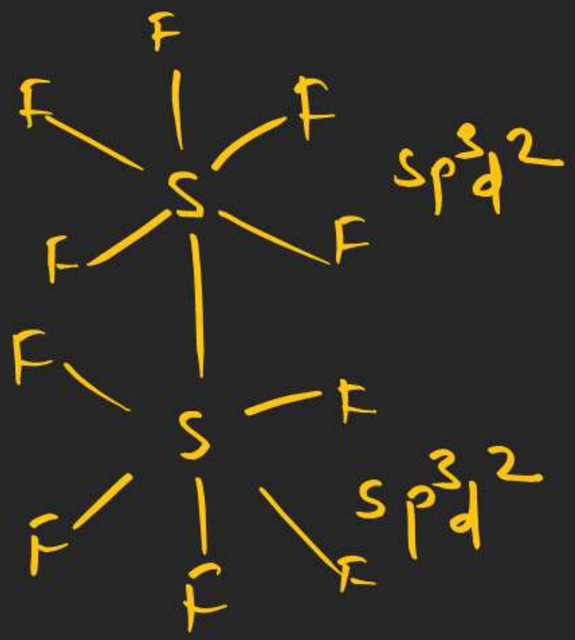


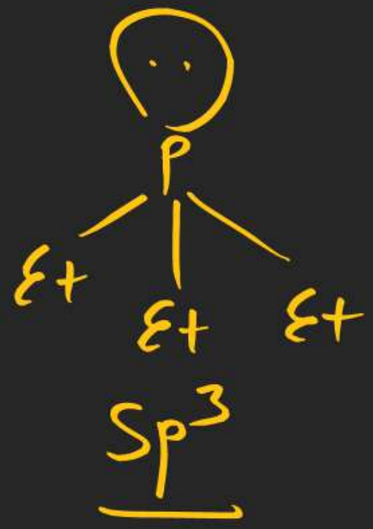
Chemical bonding

33. In which of the following molecules hybridisation of central atom is $sp^3 d^2$.

(A) XeF_6 (B) S_2F_{10} (C) SF_4 (D) PEt_3



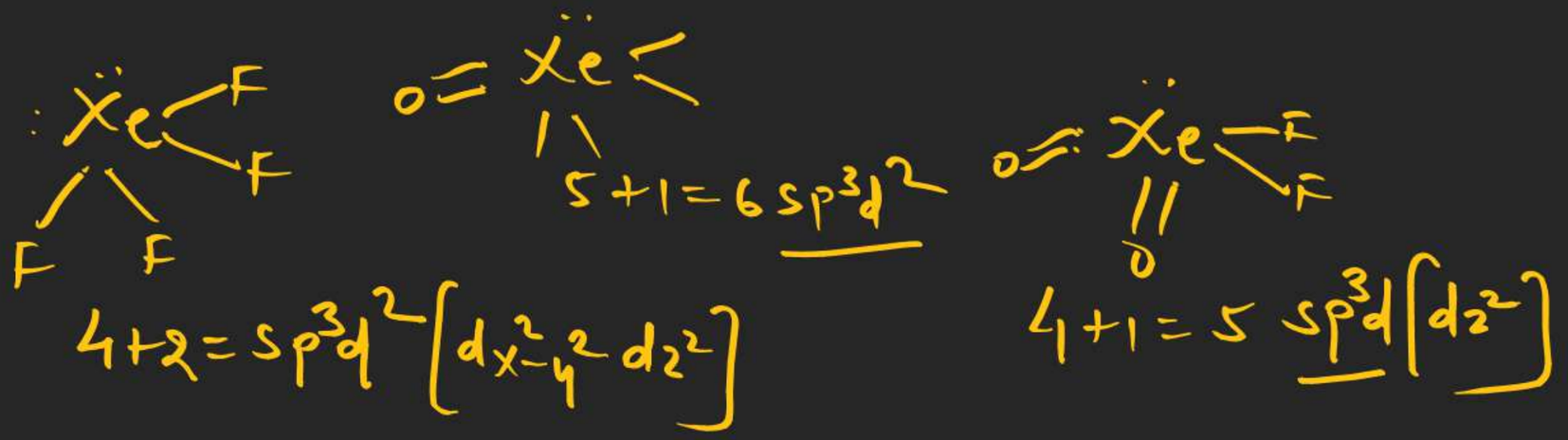




Chemical bonding

34. Which of the following molecule involve d_{z^2} orbital in it's hybridisation

(A) XeF_4 (B) $XeOF_4$ (C) XeO_2F_2 (D) All of these

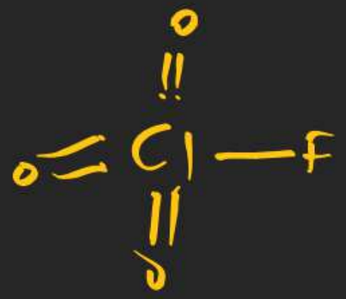


Chemical bonding

35. Hybridisation of $ClFO_3$, SF_4 & SOF_4 respectively will be

(A) sp^3, sp^3d, sp^3d (B) sp^3, sp^3 sp^3

(C) sp^3, sp^3d^2 sp^3d^2 (D) All sp^3 d



4 + 0 = 4

sp^3

4 + 1 = 5

sp^3d

5 + 0 = 5

sp^3d

Chemical bonding

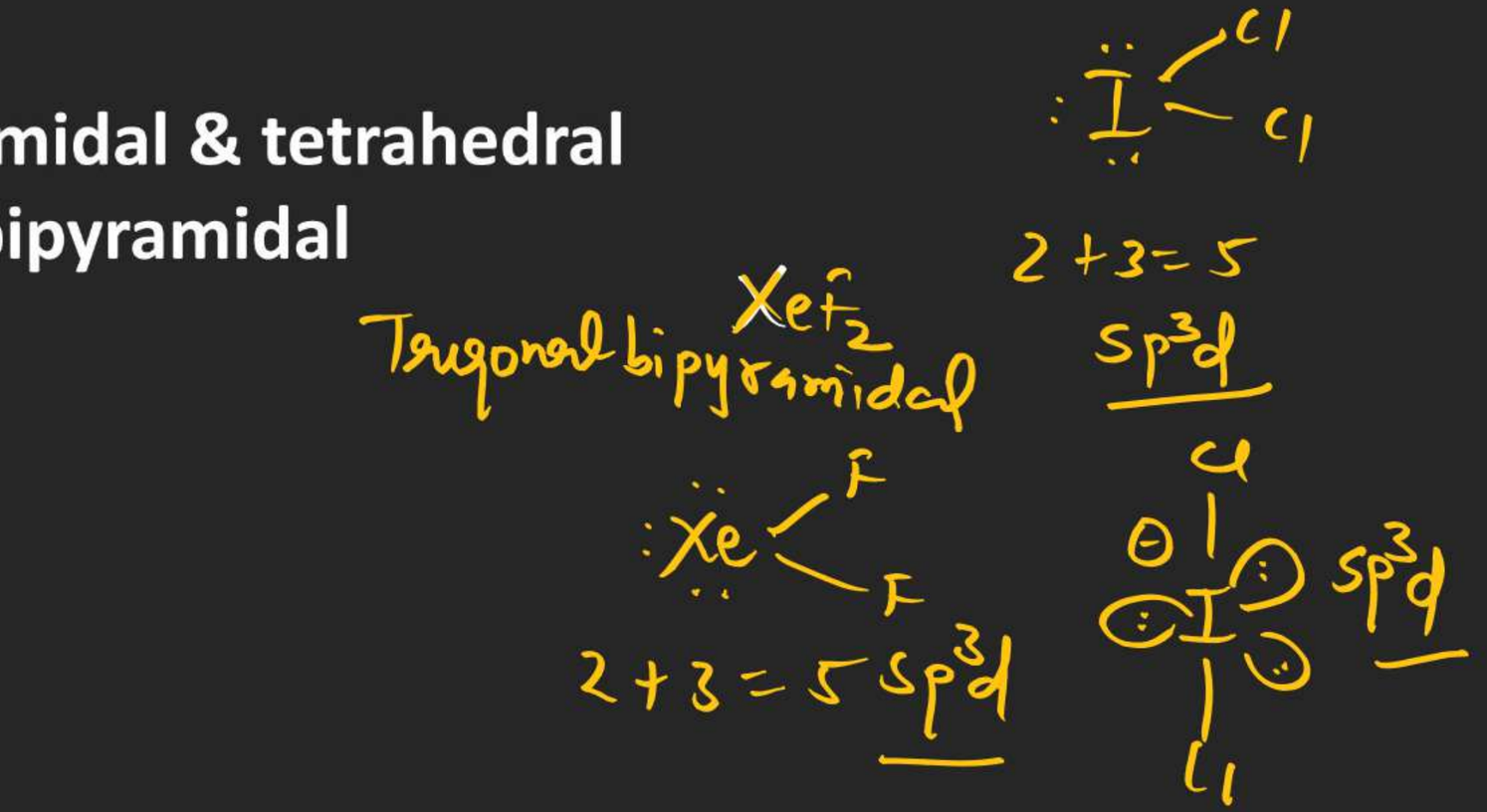
36. Electron geometry of the molecule XeF_2 & $IC1_2^-$ are respectively?

(A) square bipyramidal, tetrahedral

(B) linear & linear

(C) Trigonal bipyramidal & tetrahedral

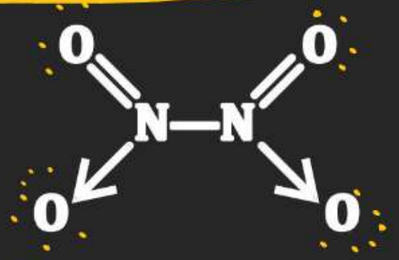
(D) Both Trigonal bipyramidal



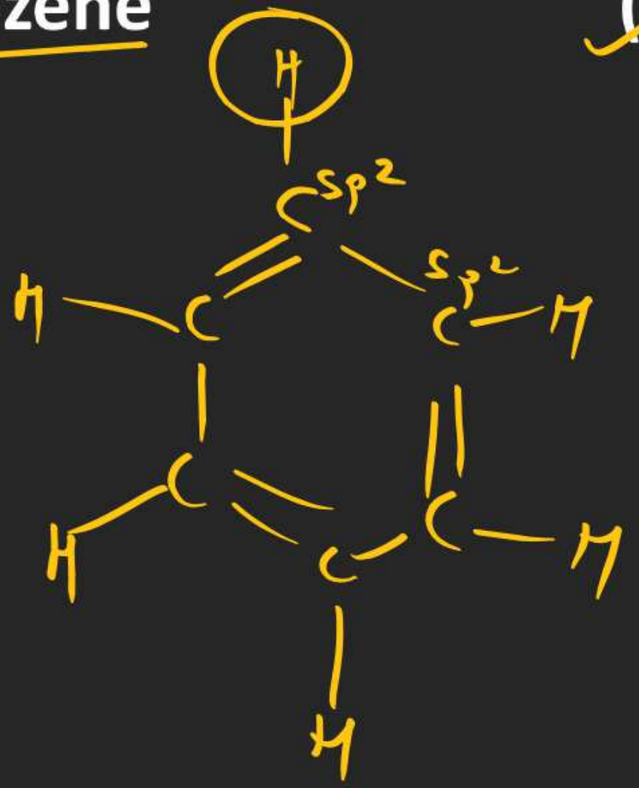
Chemical bonding

37. Which of the following molecule have all atoms sp^2 Hybridised ?

(A) 

(B) 

(C) Benzene



(D) None of these

Chemical bonding

38. Which of the following statement is CORRECT?

(A) Lattice energy is always highest for compound with highest ionic character

(B) Hydrated radius is inversely proportional to hydration energy

(C) Dissolution of salt in water depends upon lattice energy and hydration energy

(D) None of these

L.E < H.E

LiCl NaCl KCl RbCl CsCl

L.E $\propto \frac{1}{\text{size}}$

L.E $\propto$ charge

Chemical bonding

39. Correct statement about a molecule of type AB_3L where $A =$ central atom, $L =$ lone pair, $B =$ bond pair.

(A) It is pyramidal in shape

(B) NH_3 is one of the example of this case

(C) It has tetrahedral electron geometry

(D) All are correct.

AB_3L

Chemical bonding

40. Phi(ϕ) bond is present in

(A) $Mn_2(CO)_{10}$ (B) U_2 (C) O_2 (D) None of these

Phi (ϕ) bond = Six lobe interaction is called ϕ bond

Chemical bonding

41. Which of the following compound is planar ?

(A) PH_4^+ (B) XeF_4 (C) $XeOF_4$ (D) SF_6

PH_4^+

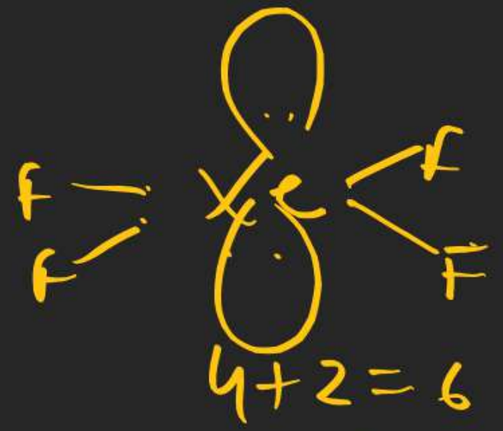
nonplanar

$\equiv P-$

$4+0=4$

sp^3

tetrahedral



$4+2=6$

sp^3d^2

Sq. planar

planar

$5+1=6$

sp^3d^2

nonplanar

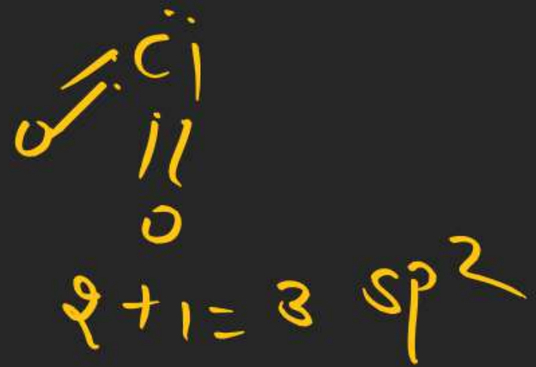
non planar

Chemical bonding

42. Hybridisation of cationic part of $Cl_2O_6(s)$ is -

(A) sp^2 (B) sp^3 (C) $sp^3\,d$ (D) $sp^3\,d^2$

$$Cl_2O_6 \longrightarrow ClO_2^+ + ClO_4^-$$



$2+1=3$ sp^2

Chemical bonding

43. Which compound given below has sp^3, sp^2 and sp orbitals in the ratio of 6: 3: 2 ?

(A) $\overset{sp^3}{C}H_3 - \overset{sp^2}{C}H = \overset{sp^2}{C}H - \overset{sp^3}{C}H_2 - \overset{sp}{C} \equiv \overset{sp}{C} - \overset{sp^3}{C}H_3$

(B) $CH_3 - CH = CH - CH_2 - C \equiv CH$

(C) $CH_3 - CH_2 - C \equiv C - CH = CH_2$

(D) $CH_3 - CH = CH - C \equiv CH$

sp^3

6 : 3 : 2

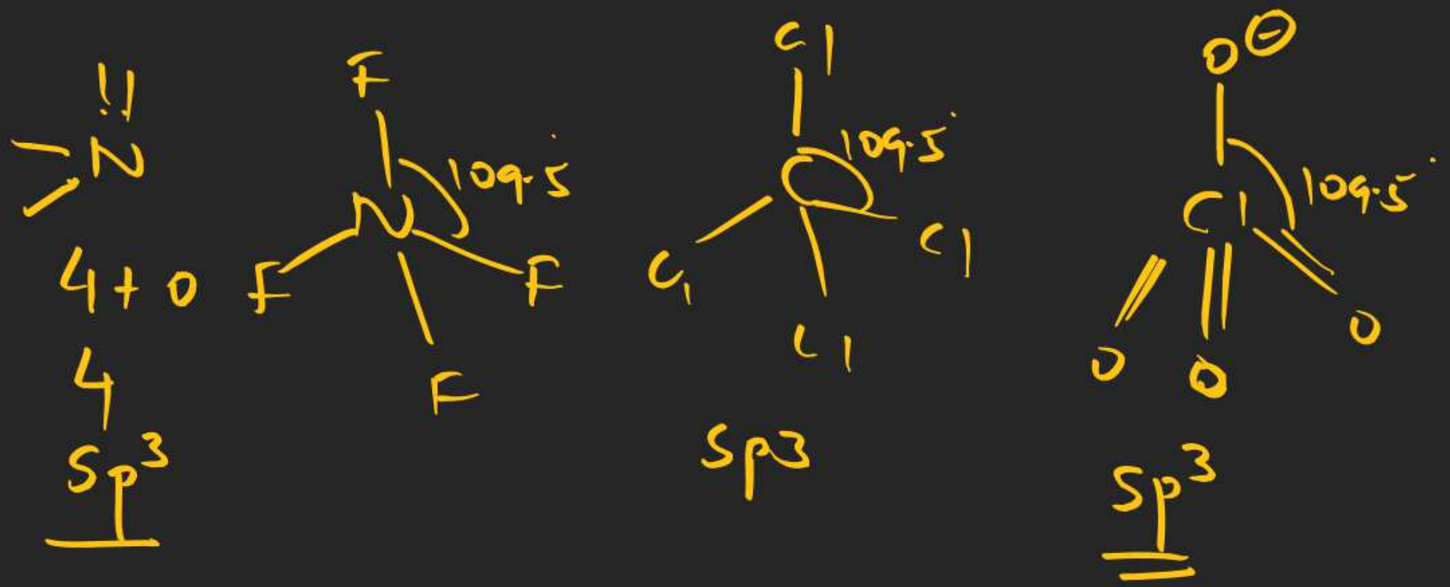
12 : 6 : 4

6 3 2

Chemical bonding

44. The molecule/ion in which bond angle is less than 107°.

(A) NF_4^+ (B) CCl_4 (C) ClO_4^- (D) None of these



Chemical bonding

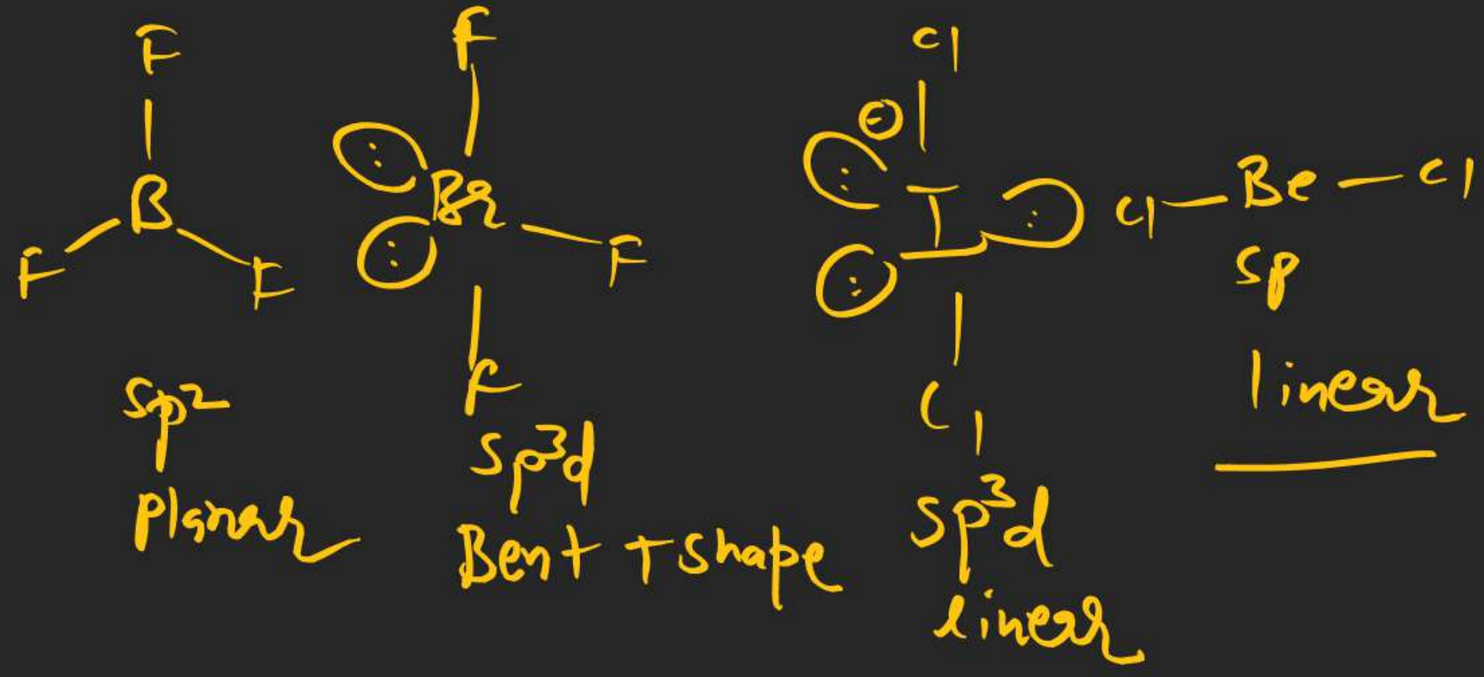
45. Select pair of compounds in which both have different hybridisation but have same molecular geometry.

(A) BF_3, BrF_3

(B) ICl_2^-, $BeCl_2$

(C) BCl_3, PCl_3

(D) PCl_3, NCl_3



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Chemical bonding

46. Choose the correct option for following statements :

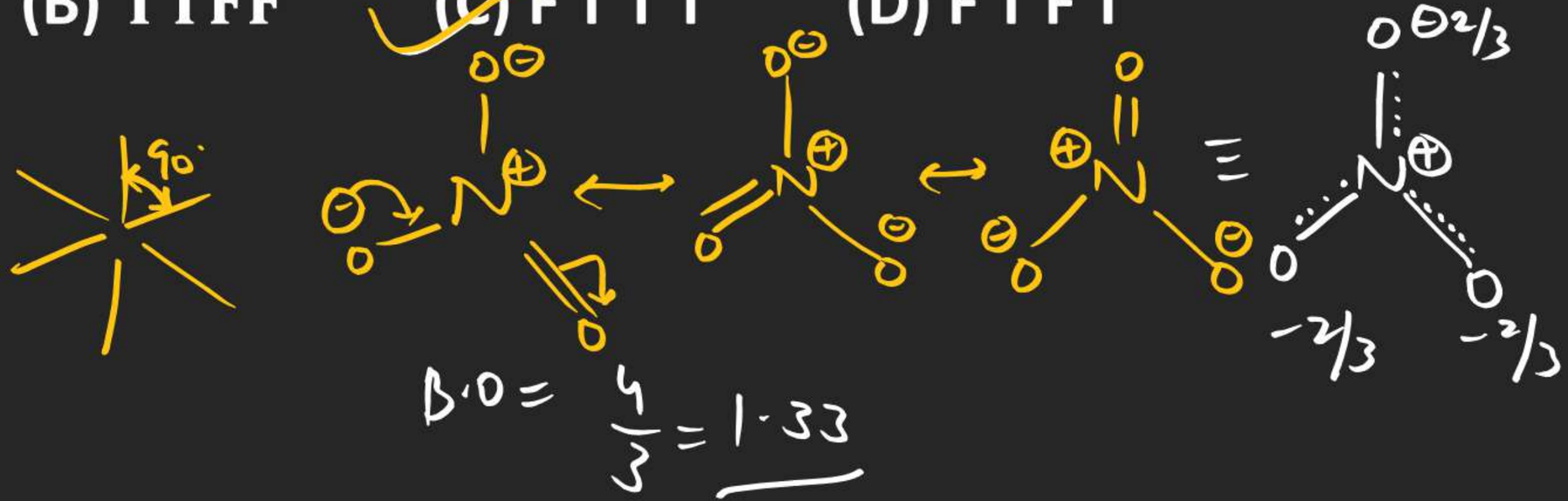
(I) sp^3 hybrid orbitals are at 90° to one another

(II) $sp^3\ d^2$ adjacent hybrid orbitals are at 90° to one another

(III) sp^2 hybrid orbitals are at 120° to one another

(IV) Bond order of $N-O$ bond in NO_3^- is 1.33

(A) TFTF (B) TTFF (C) F T T T (D) F T F T



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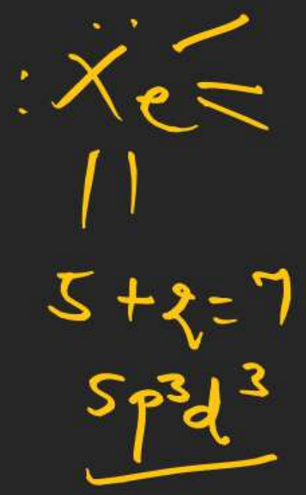
Chemical bonding

47. Which of the following specie has $sp^3\ d^3$ hybridisation ?

(A) XeF_5^- (B) SO_3 (C) SO_2 (D) XeF_2



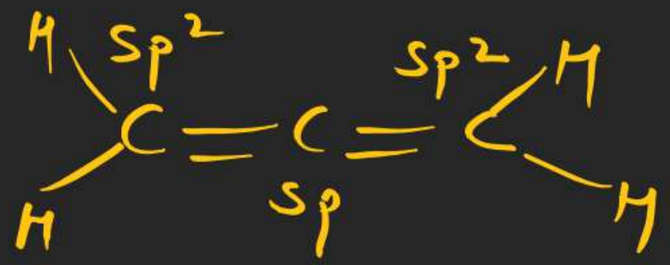
Chemical bonding

48. If x is the no. of hybrid orbital containing 33.3% s-character and y is the number of hybrid orbital's containing 50% s-character then, find the value of x ÷ y for allene.

(A) 2 (B) 3 (C) 6 (D) 3.5

allene

(C_3H_4)



x ÷ y

sp²

3 : 2

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

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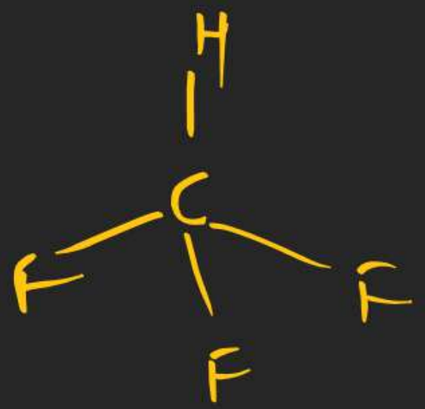
Chemical bonding

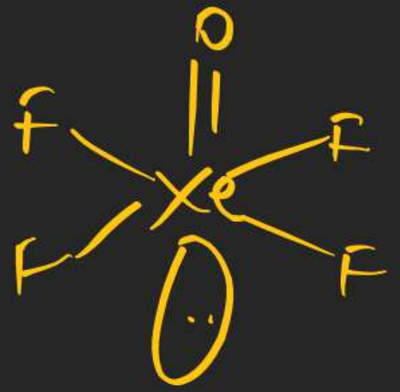
49. All fluorine atoms are in same plane in:

(A) CHF_3 (B) ClF_3 (C) $XeOF_4$ (D) All of these



sp^3d

plana



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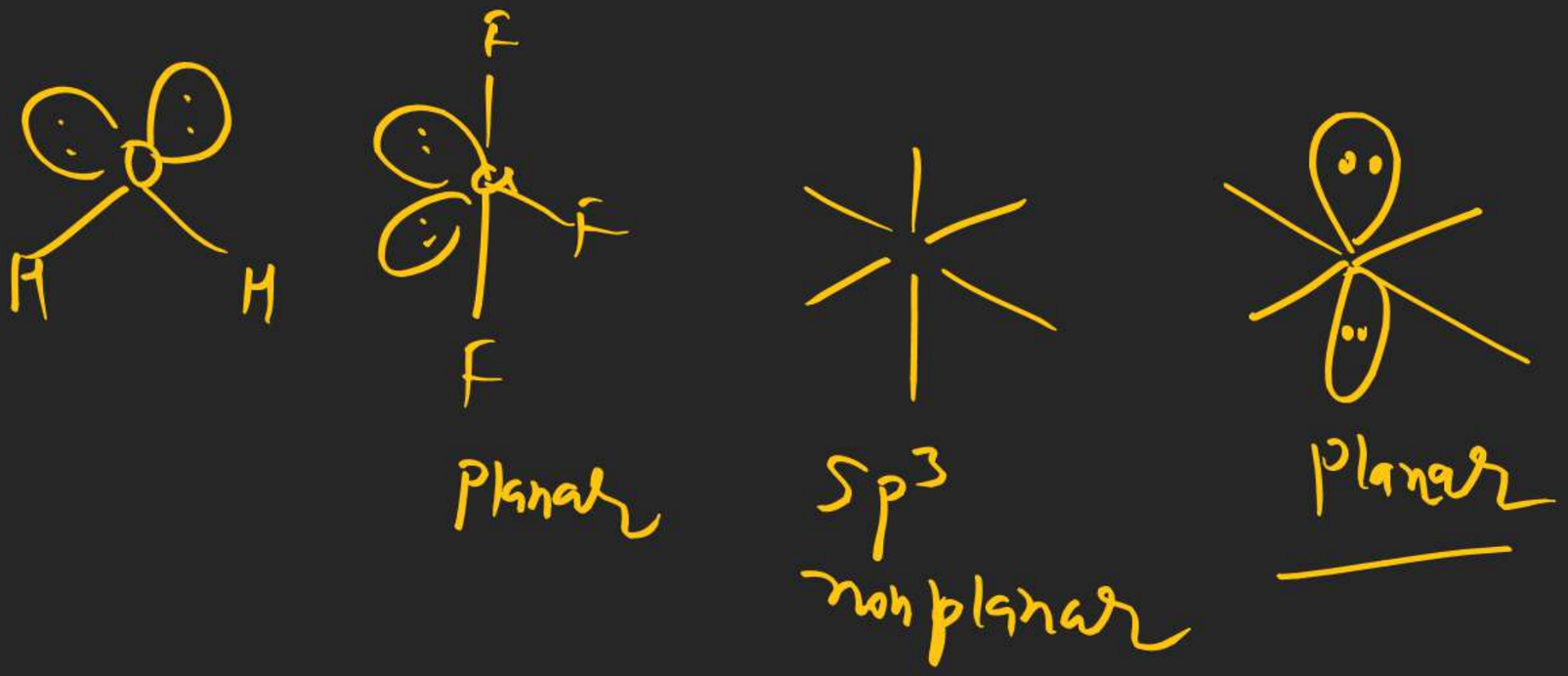
Chemical bonding

50. Select hybridisation which have non planar geometry when all are bond pair, but planar when there are 2 lone pairs on central atom:
(A) sp^3 (B) sp^3d (C) $sp^3\ d^2$ (D) All of these



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Chemical bonding

51. Select correct statement for BrF_5.

(A) All fluorine atoms are in same plane

(B) Four fluorine atoms and Br atom is in same plane

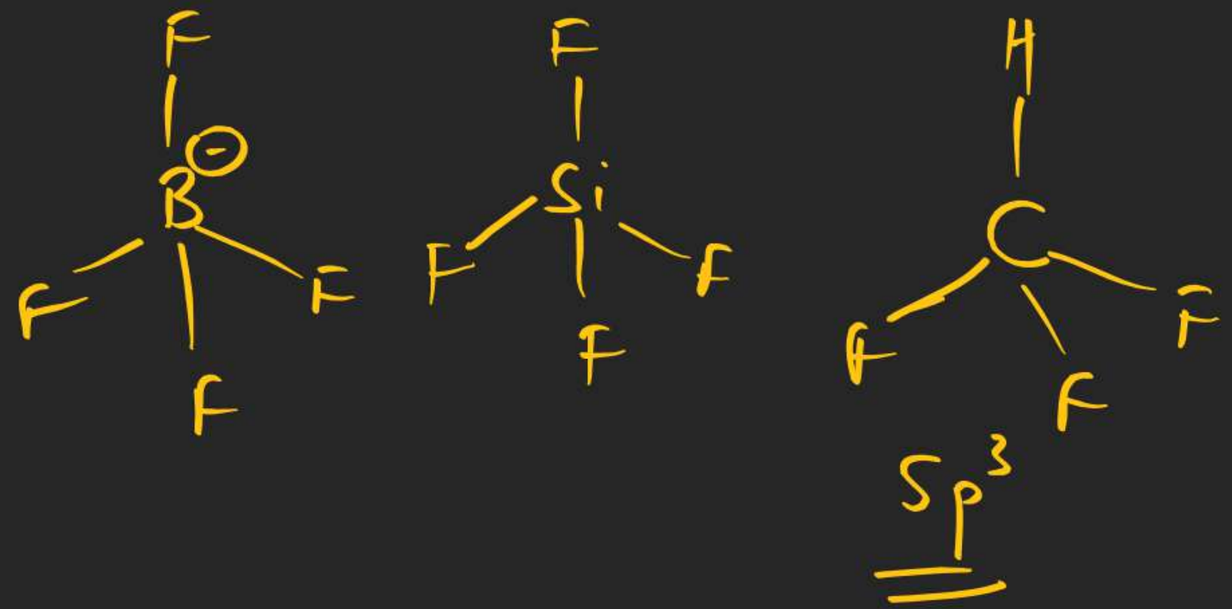
(C) Four fluorine atoms are in same plane

(D) It has all $F - Br - F$ bond angles at 90°

Chemical bonding

52. In which of following cases, the central atom is not perfectly sp^3 hybridised?

(A) BF_4^- (B) SiF_4 (C) CHF_3 (D) CCl_4



Chemical bonding

53. Which of the following compound has the smallest bond angle $(X - A - X)$ in each series respectively :

(A) $OSF_2 < OSCl_2 < OSBr_2$

(B) $SbCl_3 < SbBr_3 < SbI_3$

(C) $PI_3 > AsI_3 > SbI_3$

(A) $OSF_2, SbCl_3$ and PI_3

(B) $OSBr_2, SbI_3$ and PI_3

(C) OSF_2, SbI_3 and PI_3

(D) $OSF_2, SbCl_3$ and SbI_3

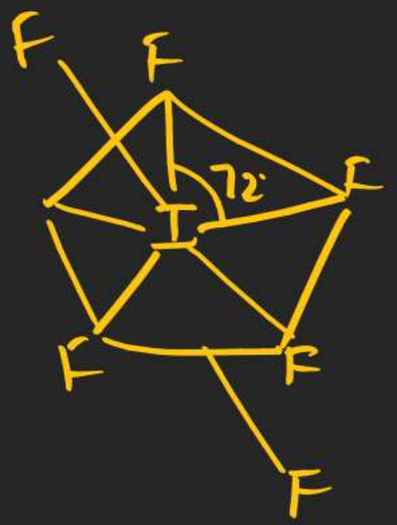
B.A $\propto \frac{1}{\text{E.N of S.A}}$

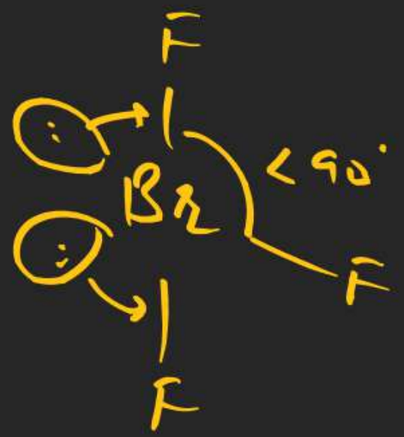
B.A $\propto$ E.N of C.A

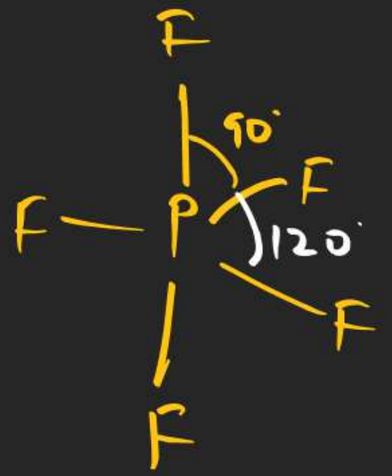
Chemical bonding

54. Molecule which does not contain any $F - X - F$ bond angle which is less than 90° :
(X = central atom)

(A) IF_7 (B) BrF_3 (C) PF_5 (D) SF_4







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Chemical bonding

55. What is the geometry of the IBr_2^- ion?

(A) Linear

(B) Bent shape with bond angle of about 90°

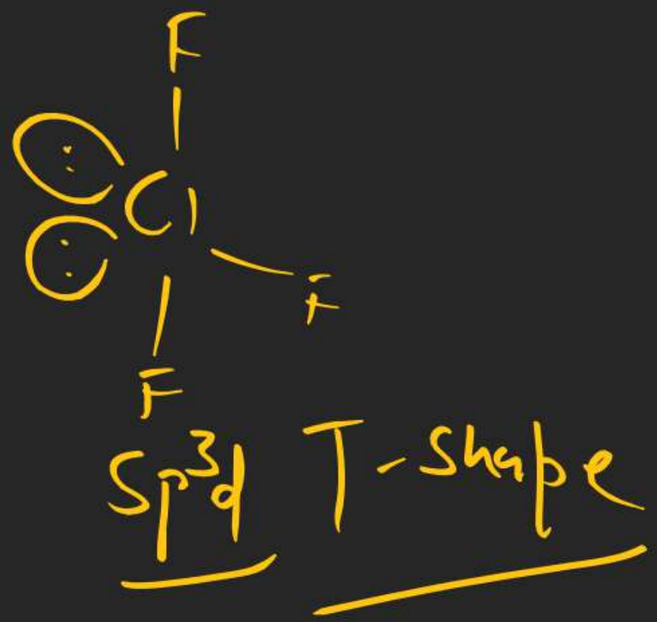
(C) Bent shape with bond angle of about 109°

(D) Bent shape with bond angle of about 120°

Chemical bonding

56. What is the shape of the ClF_3 molecule ?

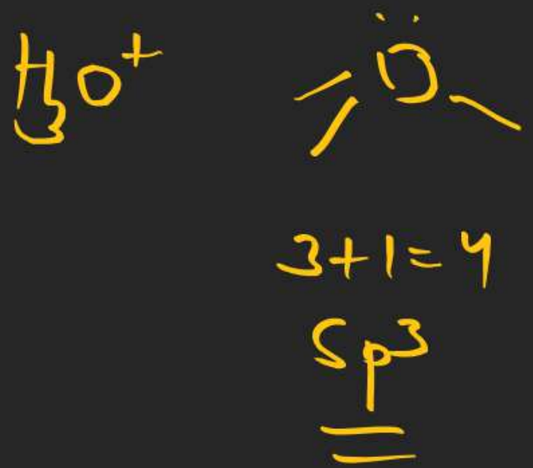
(A) Trigonal planar
(B) Trigonal pyramidal
(C) T-shaped
(D) Tetrahedral



Chemical bonding

57. The $H-O-H$ bond angles in H_3O^+ are approximately 107°. The orbitals used by oxygen in these bonds are best described as :

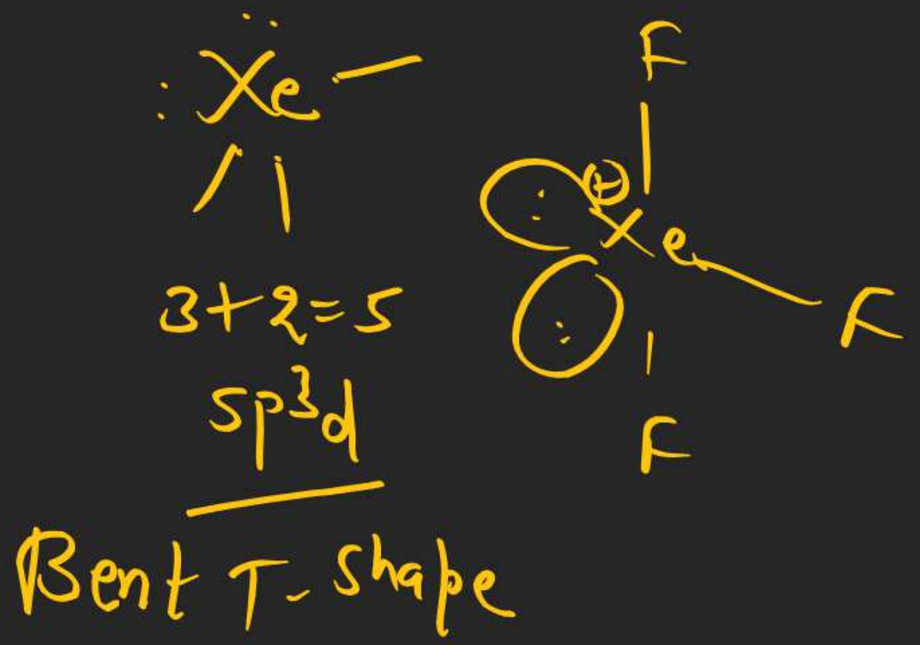
(A) p-orbitals
(B) sp-hybrid orbitals
(C) sp^2-hybrid orbital
(D) sp^3-hybrid orbital



Chemical bonding

58. The shape of XeF_3^+ is :

(A) Trigonal planar
(B) Pyramidal
(C) Bent T-shape
(D) See-saw



Chemical bonding

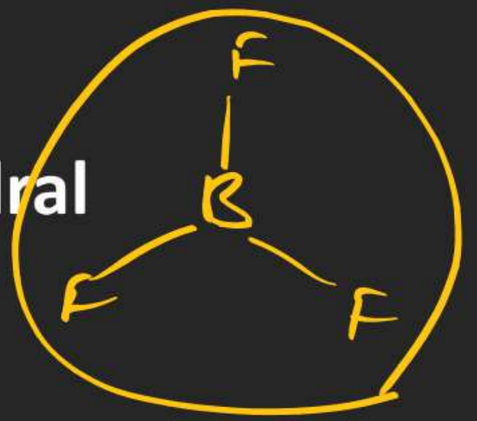
59. Which of the following shape are not possible for possible value of ' n ' in XeF_n molecule?

(A) Linear

(B) Square planar

(C) Trigonal planar

(D) Capped octahedral

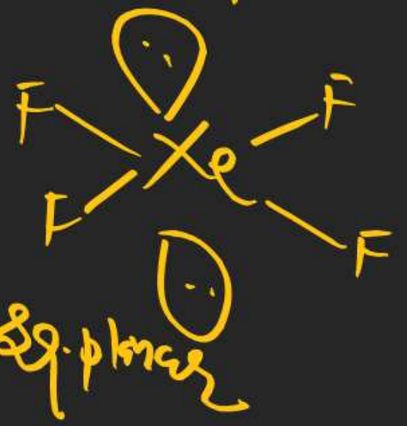


XeF_n

XeF_2

linear

XeF_4



Sq. planar

XeF_6

Capped octahedral

Chemical bonding

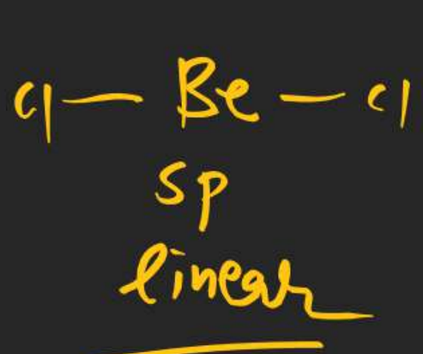
60. Which of the following is the correct set with respect to molecule, hybridization and shape?

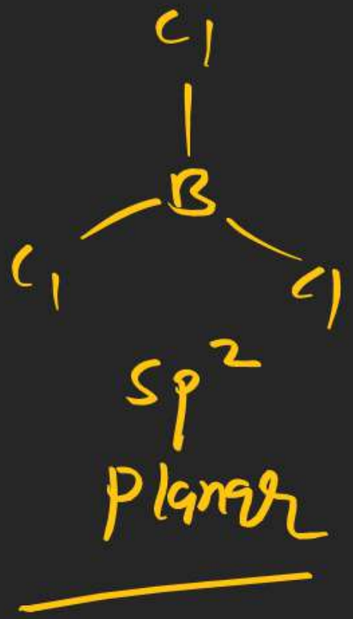
(A) $BeCl_2$, sp^2, linear

(B) $BeCl_2$, sp^2 triangular planar

(C) BCl_3, sp^2, triangular planar

(D) BCl_3, sp^3, tetrahedral

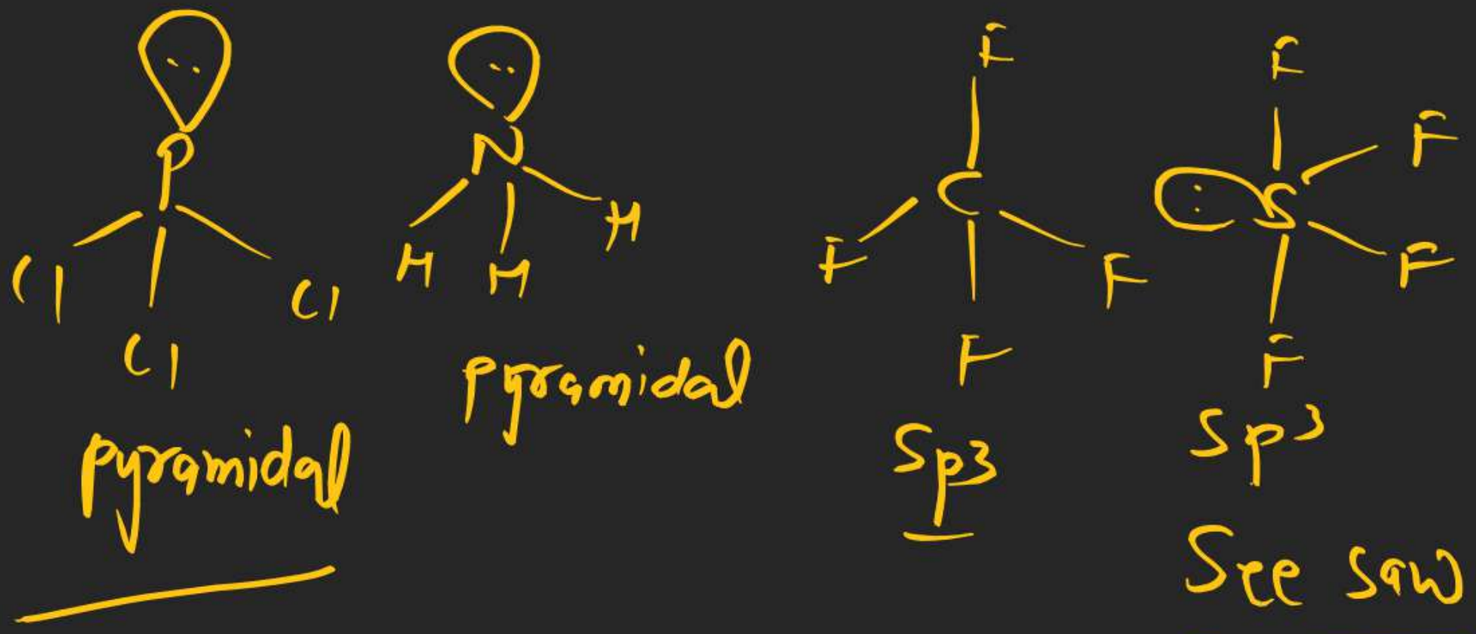




Chemical bonding

61. The pair of species with similar shape is :

(A) PCl_3, NH_3 (B) CF_4, SF_4 (C) $PbCl_2, CO_2$ (D) PF_5, IF_5



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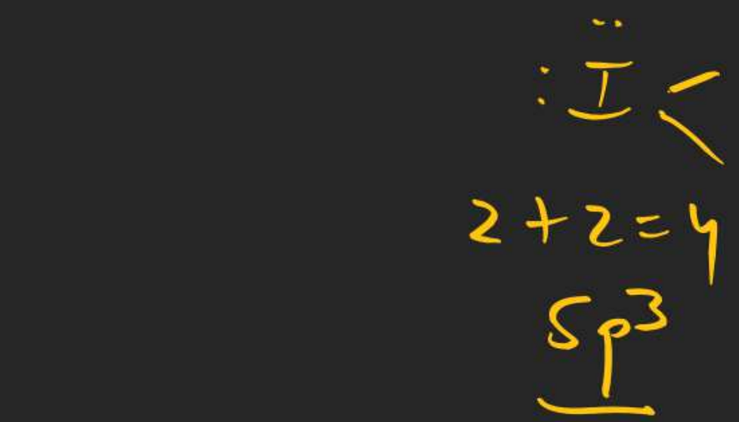
Chemical bonding

62. The hybridization of the central atom in ICl_2^+ is :

(A) dsp^2 (B) sp (C) sp^2 (D) sp^3

ICl_2^+



$2+2=4$

sp^3

Chemical bonding

63. The state of hybridization of the central atom is not the same as in the others :

(A) B in BF_3 (B) O in H_3O^+ (C) N in NH_3 (D) P in PCl_3

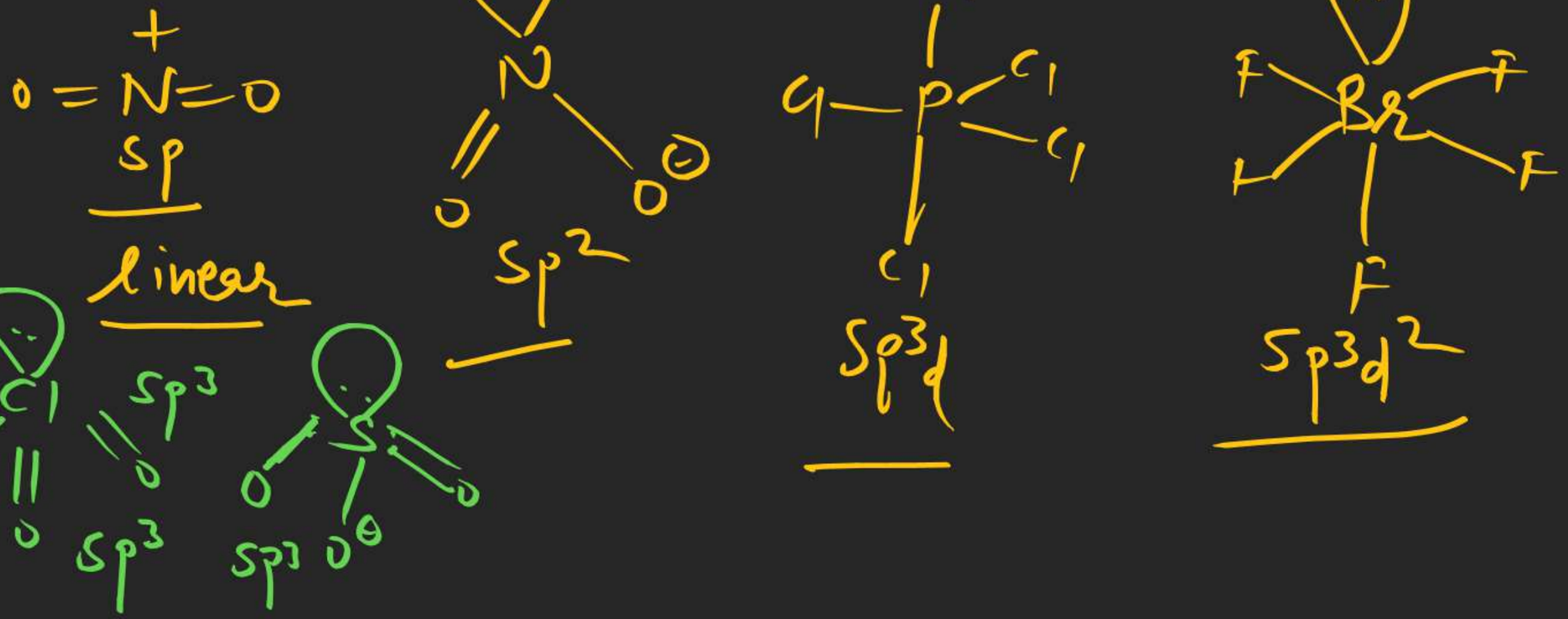
sp^2 sp^3 sp^3 sp^3

Chemical bonding

64. Which is the following pairs of species have identical shapes ?

(A) NO_2^+ and NO_2^- (B) PCl_5 and BrF_5

(C) ClO_3^- and SO_3^{-2} (D) $TeCl_4$ and XeO_4



Chemical bonding

65. The shapes of XeF_4, XeF_5^- and $SnCl_2$ are :

(A) Octahedral, trigonal bipyramidal and bent

(B) Square pyramidal, pentagonal planar and linear

(C) Square planar, pentagonal planar and angular

(D) See-saw, T-shaped and linear