PYQ

face = 4

total number of S–O bond in $S_2O_8^{-2}$ is x

and face in P_4 is y

find the sum of x+y

8

8+4 = 12

S–S linkage in S_8 is x

and P–P–P bond angle is y

Sum of x + y

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Chemical bonding

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

(A) B in BF_3 — sp^2

(B) O in H_3O^+ — sp^3

(C) N in NH_3 — sp^3

(D) P in PCl_3 — sp^3

Chemical bonding

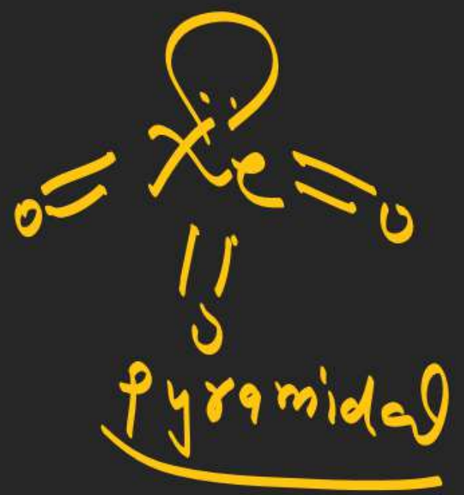
66. Which is not correctly matched ?

(A) XeO_3 - Trigonal bipyramidal

(B) ClF_3 - bent T-shape

(C) $XeOF_4$ - Square pyramidal

(D) XeF_2 — Linear shape



Chemical bonding

67. The geometry of ammonia molecule can be best described as :

(A) Nitrogen at one vertex of a regular tetrahedron, the other three vertices being occupied by three hydrogens

(B) Nitrogen at the centre of the tetrahedron, three of the vertices being occupied by three hydrogens

(C) Nitrogen at the centre of an equilateral triangle, three corners being occupied by three hydrogens

(D) Nitrogen at the junction of a T, three open ends being occupied by three hydrogens

Chemical bonding

68. Which of the following bond length is shortest?

(A) H – F (B) H – O (C) H – N (D) H – Cl

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Chemical bonding

69. CORRECT order of bond length is :-

(A) $Si - O < P - O < S - O < Cl - O$

(B) $Cl - O < S - O < Si - O < P - O$

(C) $Cl - O < S - O < P - O < Si - O$

(D) $S - O < P - O < Cl - O < Si - O$

Chemical bonding

70. The average charge on each O atom and average bond order of $I-O$ bond in IO_6^{5-} is :

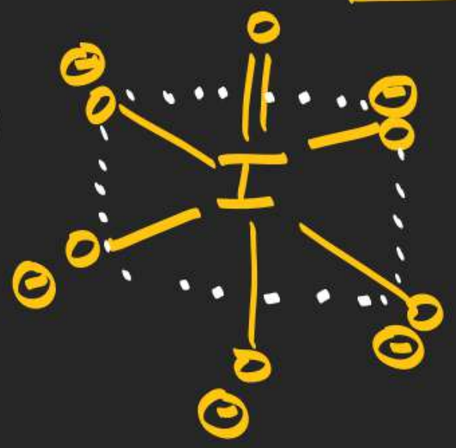
(A) -1 and 1.67
(B) $-5/6$ and 1.67
(C) $-5/6$ and 1.33
(D) $-5/6$ and 1.167

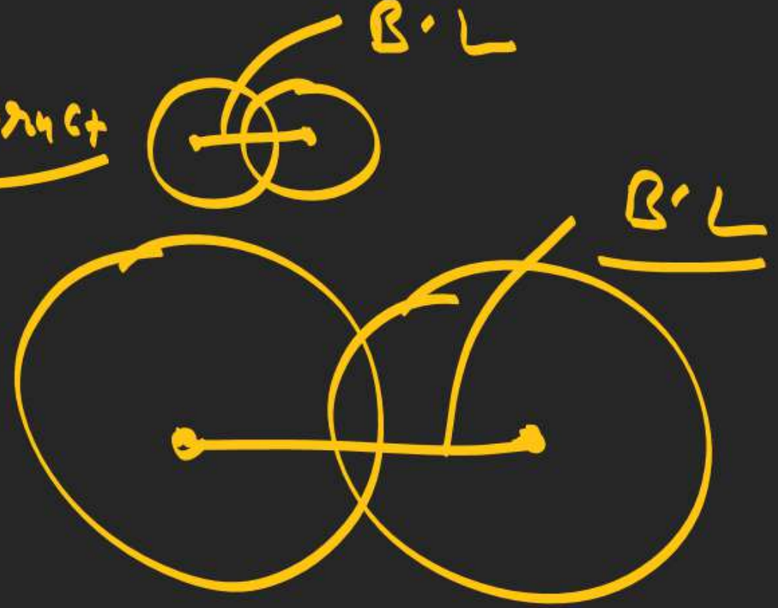
Charge = $-\frac{5}{6}$

B.O = $\frac{7}{6} = 1.167$

H.W → B.O

lewis structure





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B.O ⇒ number of bond between two atoms

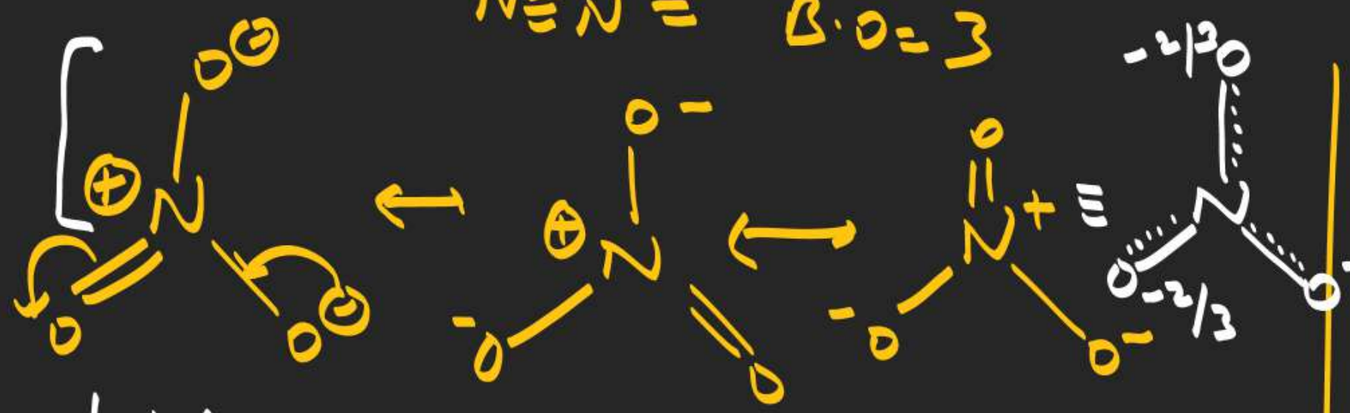
H−H = B.O = 1

O=O = B.O = 2

N≡N = B.O = 3

B.O ↑ B.L ↓

$\frac{4}{3}$



$$B.O = \frac{\text{total number of bonds b/w two atoms in all R.s}}{\text{total R.s}}$$

$$= \frac{4}{3} = 1.33$$

Condition of Resonance

= =

= l.p

= ≡

= -ive

Chemical bonding

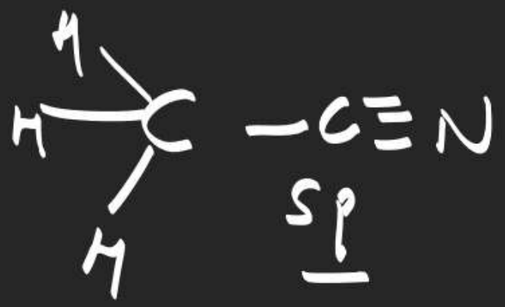
71. The correct order of C – N bond length ?

P: CH_3CN

Q: HNCO

R: CH_3CONH_2

(A) P > Q > R (B) P = Q = R (C) R > Q > P (D) R > P > Q



$-C\equiv N$

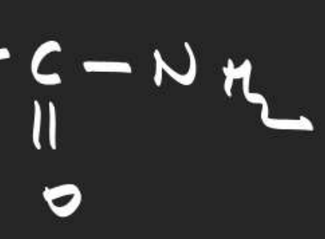
sp

$H-N=C=O$

B.O = 3

2

B.O ↑ B.L ↓



B.O = 1

Chemical bonding

72. Which of the following has maximum oxidising character.

(A) F_2 (B) Cl_2 (C) Br_2 (D) I_2

oxidising power

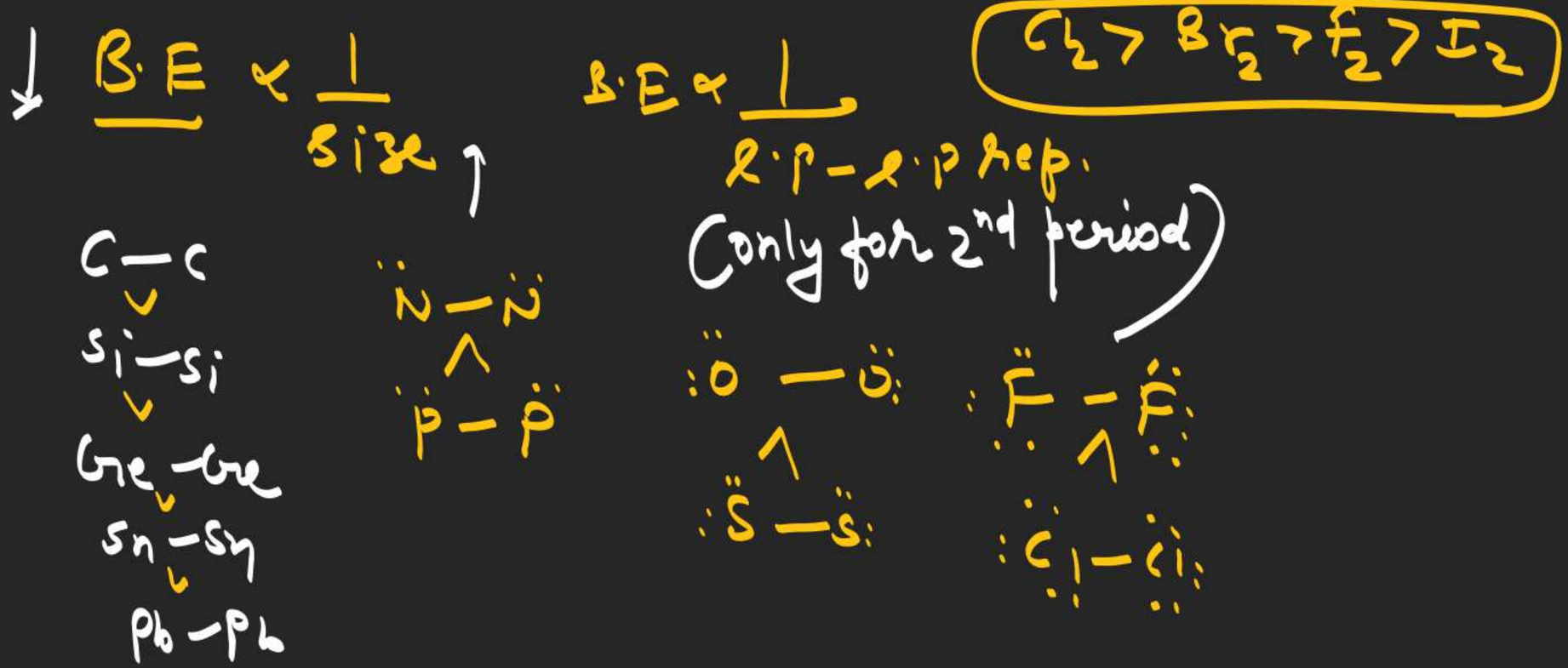
or

$F_2 > Cl_2 > Br_2 > I_2$

Chemical bonding

73. Which of the following having second highest bond dissociation energy (out of given molecules).

(A) F_2 (B) Cl_2 (C) Br_2 (D) I_2

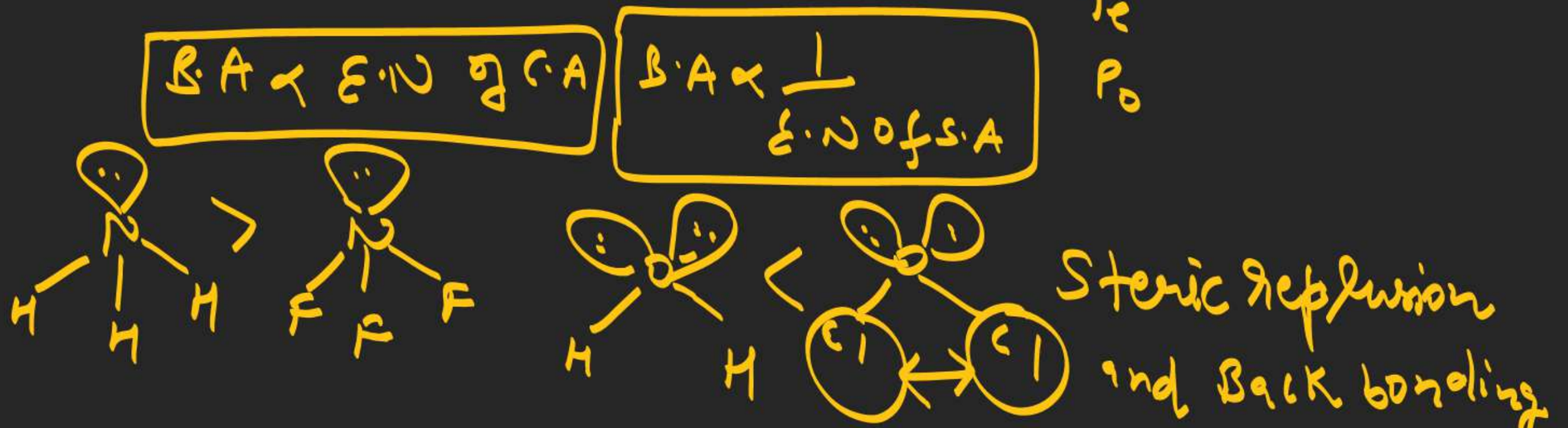


Chemical bonding

74. Which is the correct order of the bond angle ?

(A) $NH_3 < NF_3$ (B) $H_2O > Cl_2O$

(C) $PH_3 < SbH_3$ (D) $H_2Te < H_2S$



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Chemical bonding

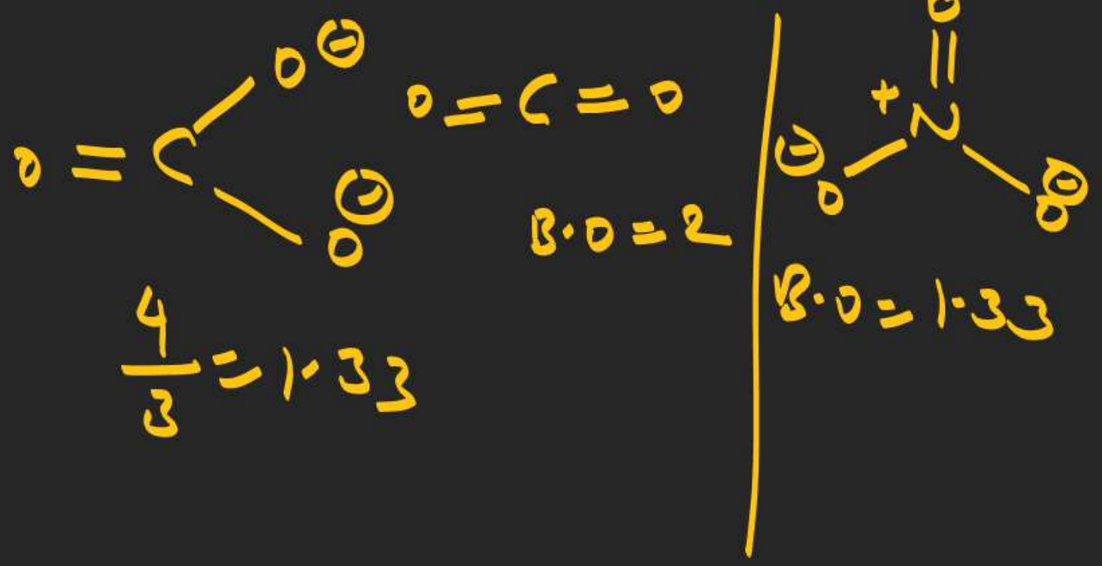
75. Which of the following order is/are CORRECT :-

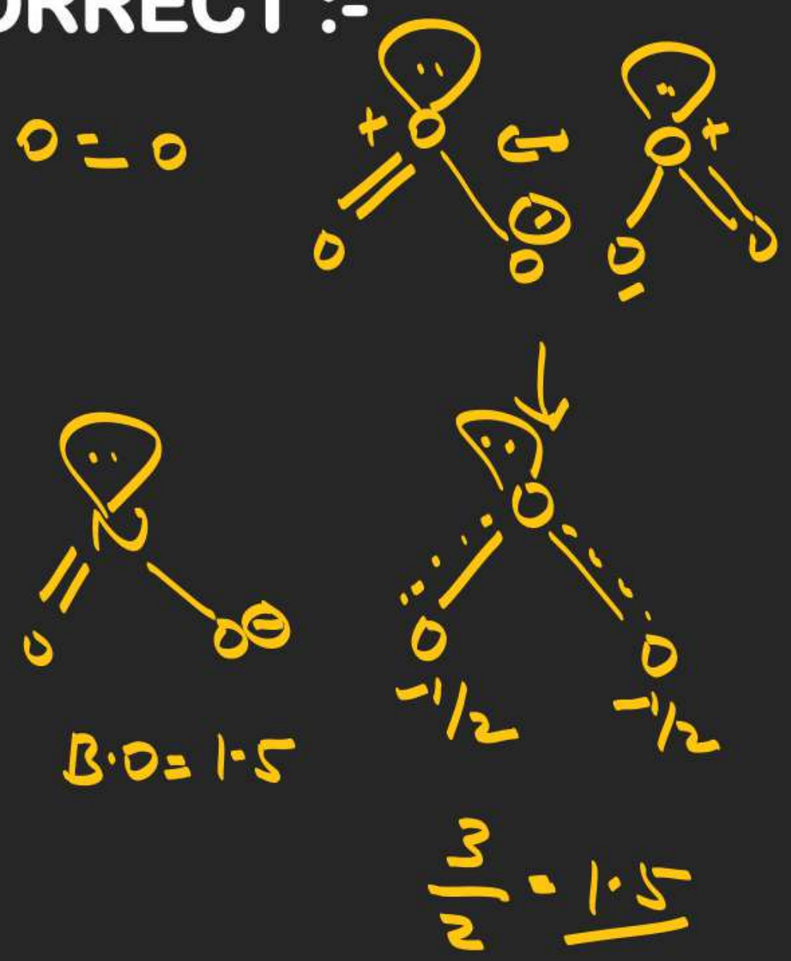
(A) $CO_3^{2-} < CO_2$ (C − O bond length)

(B) $NO_3^- < NO_2$ (N − O bond length)

(C) $O_2 < O_3$ (O − O bond length)

(D) $C_6H_6 < C_2H_4$ (C − C bond length)





Chemical bonding

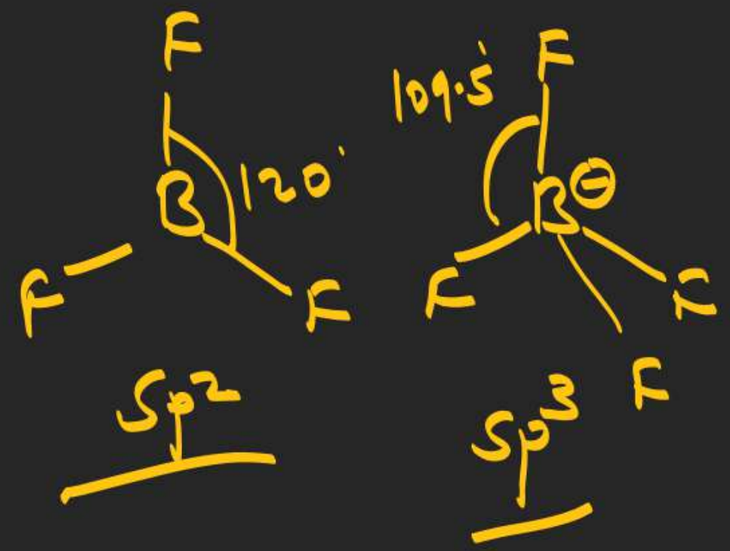
76. CORRECT order of bond angle is ?

(A) $BCl_3 > BF_3$

(B) $CCl_4 > BF_3$

(C) $BF_3 > BF_4^-$

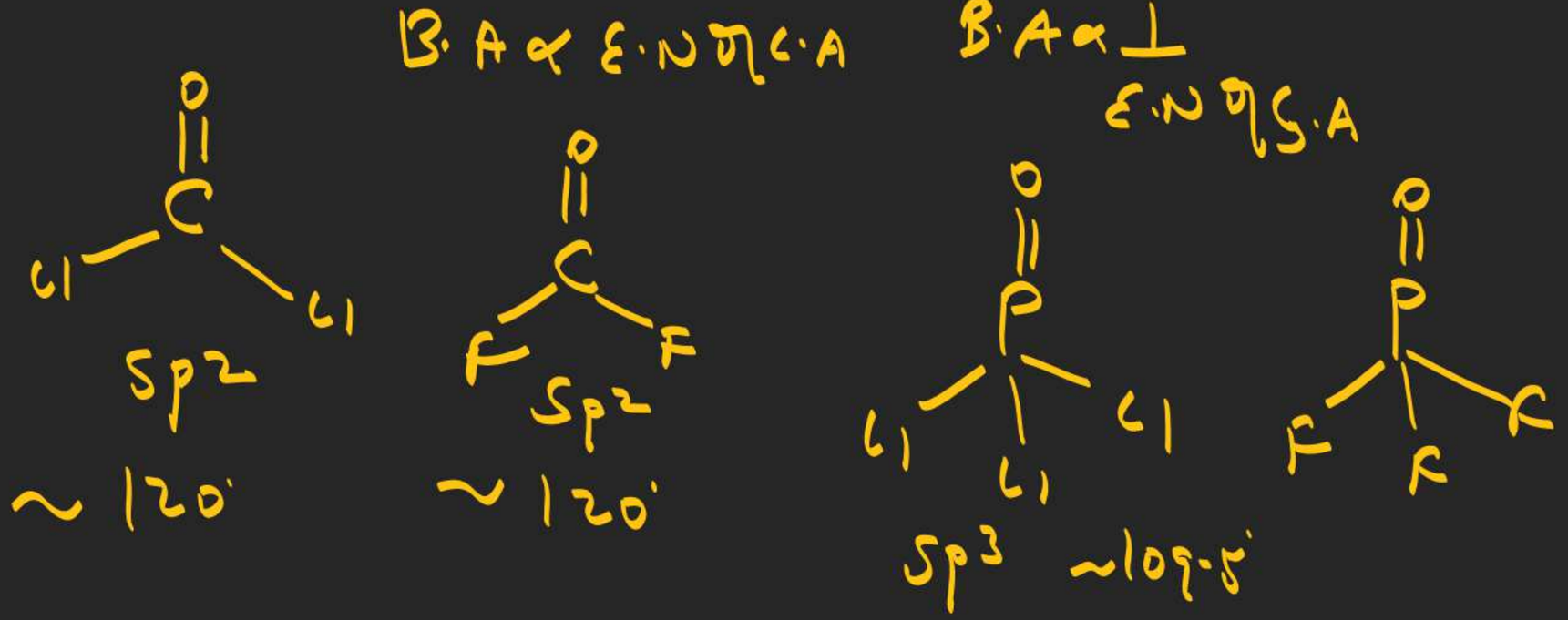
(D) $H_2O = O(CH_3)_2$



Chemical bonding

77. Which of the following has smallest bond angle $X - A - X$ is present ? (X is halogen & A is central atom)

(A) $COCl_2$ (B) COF_2 (C) $POCl_3$ (D) POF_3



Chemical bonding

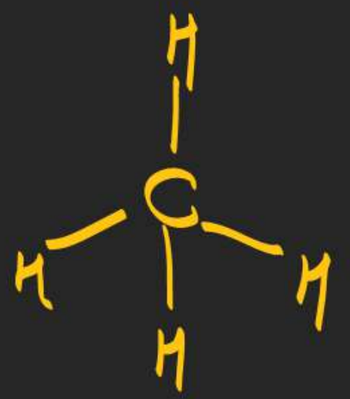
78. Maximum bond angle will be present in which of the following molecule?

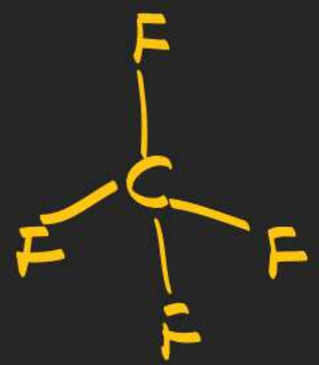
(A) CH_4

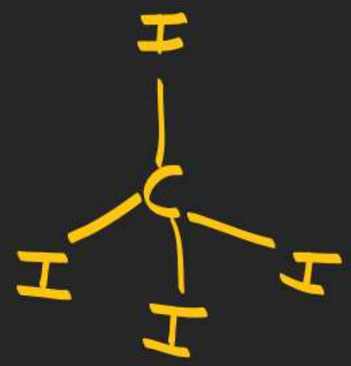
(B) CF_4

(C) CI_4

(D) All have same bond angle







= 109.5°

Chemical bonding

81. The bond angles of NH_3, NH_4^+ and NH_2^- are in the order

(A) $NH_2^- > NH_3 > NH_4^+$

(B) $NH_4^+ > NH_3 > NH_2^-$

(C) $NH_3 > NH_2^- > NH_4^+$

(D) $NH_3 > NH_4^+ > NH_2^-$

Chemical bonding

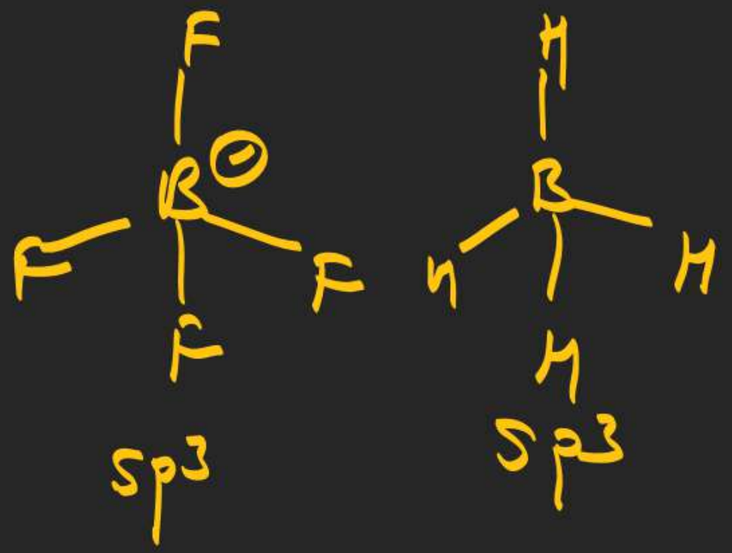
82. In which of the following pair of species, all bond angles are equal

(A) $CO_3^{2-}, COCl_2$

(B) $PO_4^{3-}, POCl_3$

(C) BF_4^-, BH_4

(D) CH_3F, CH_4



Chemical bonding

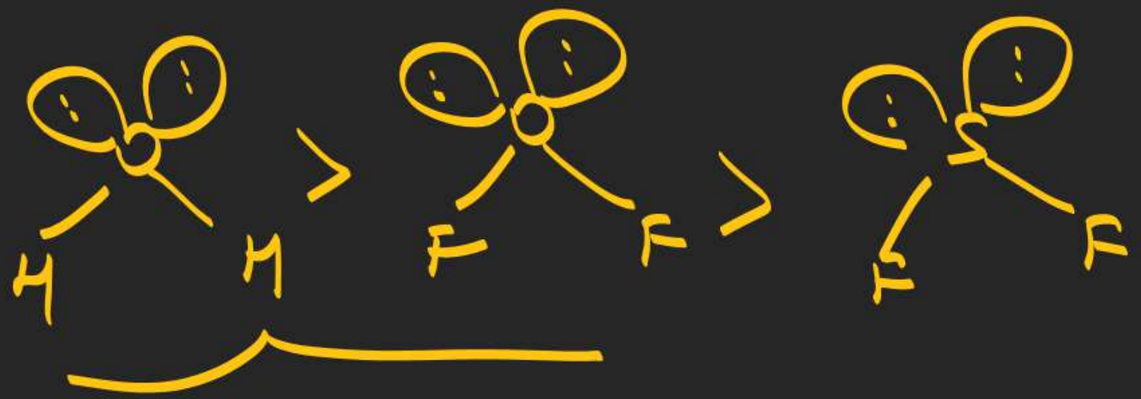
83. The correct order of bond angle is

(A) $H_2O > OF_2 > SF_2$

(B) $H_2O > SF_2 > OF_2$

(C) $H_2O < OF_2 > SF_2$

(D) $H_2O > OF_2 < SF_2$

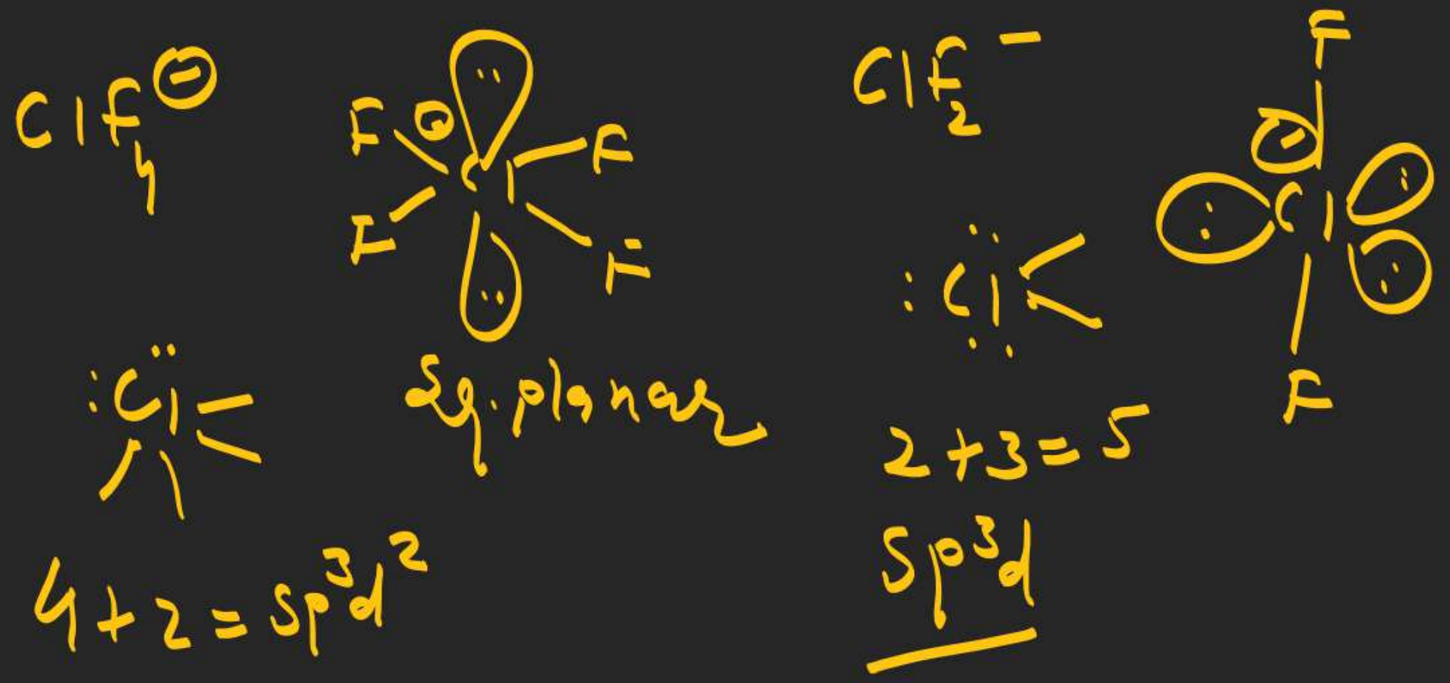


Chemical bonding

84. The shape of $[ClF_4]^-$ and $[ClF_2]^-$ ions is respectively

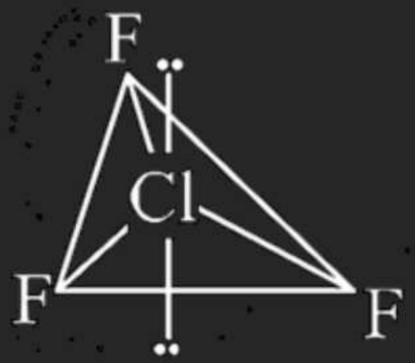
(A) See-saw and linear (B) See-saw and bent

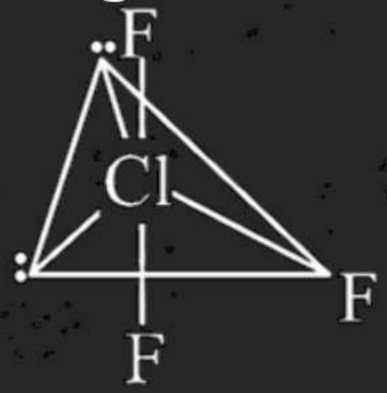
(C) Tetrahedral and linear (D) Square planar and linear.



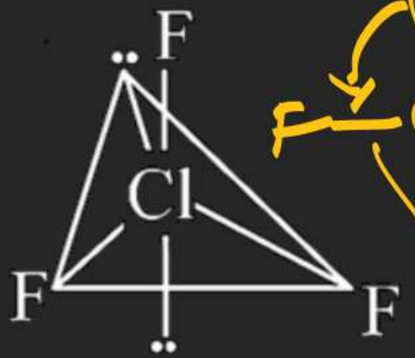
Chemical bonding

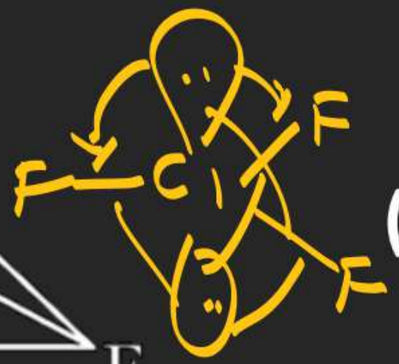
85. More correct structure of ClF_3 is :

(A) 

(B) 

Bent T-shape

(C) 



(D) All of the above

6

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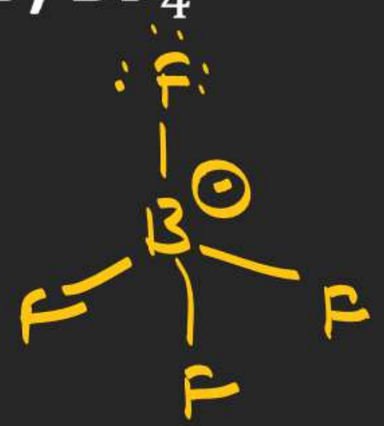
Chemical bonding

86. Which of the following molecules/species has the minimum number of lone pairs?

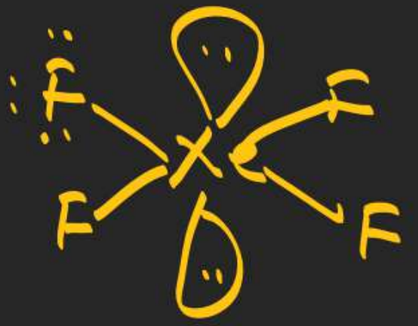
(A) ICl_3 (B) BF_4^- (C) $SnCl_2$ (D) XeF_4

total l.p = 11



12

7

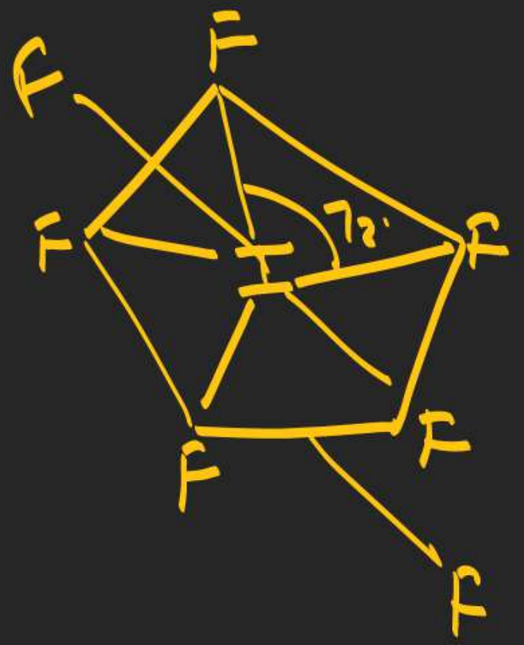


14

Chemical bonding

87. The number of $\widehat{FIF}$ adjacent angles $(90^\circ + 72^\circ)$ in IF_7 molecule is

(A) 10 (B) 15 (C) 20 (D) 14



90° = 10

72 = 5

15

Chemical bonding

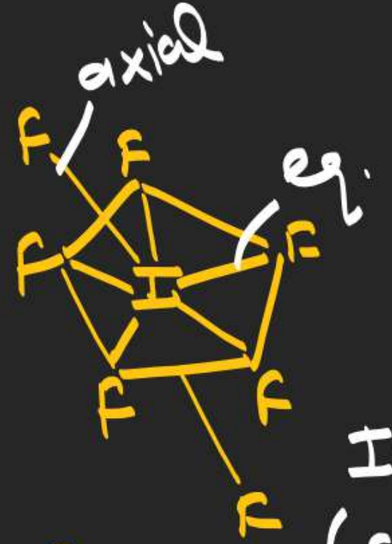
88. The number of $F - I - F$ angles less than 90° and equal to 90° are respectively in IF_7

(A) 5 and 5 (B) 10 and 5 (C) 5 and 10 (D) 10 and 15

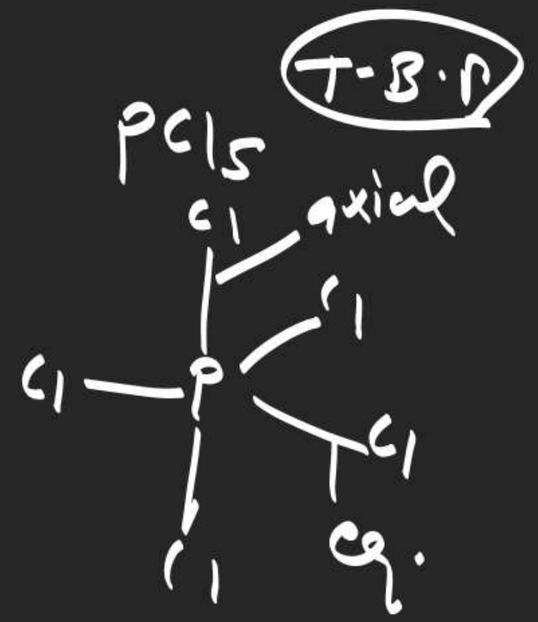
Chemical bonding

89. The number of $I - F$ bonds having the longer and shorter lengths are respectively in IF_7

(A) 5 and 2 (B) 2 and 5 (C) 5 and 5 (D) 2 and 2



I-F < I-F
(axial) (eq.)



P-Cl (axial) > P-Cl (eq.)

total Val. e^- = ^{3}B ^{4}C ^{5}N ^{6}O ^{7}F ^{8}Ne

Chemical bonding

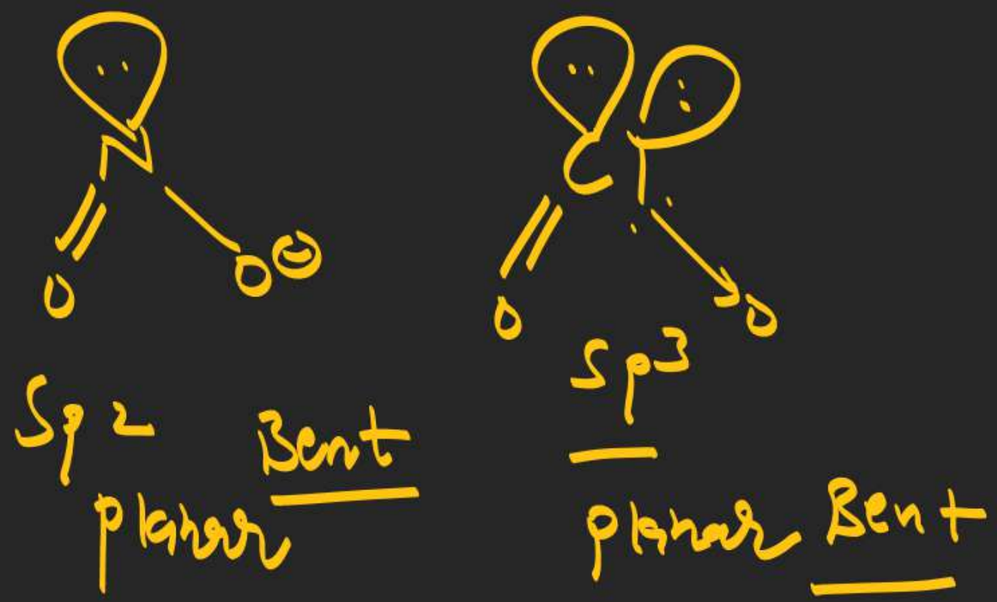
90. Find the pair of species having the same shape but different hybridization of the central atom.

(A) SO_3, CO_3^{2-}

(B) NO_2^-, ClO_2^-

(C) $BeCl_2, HCN$

(D) $XeF_2, SnCl_2$



Chemical bonding

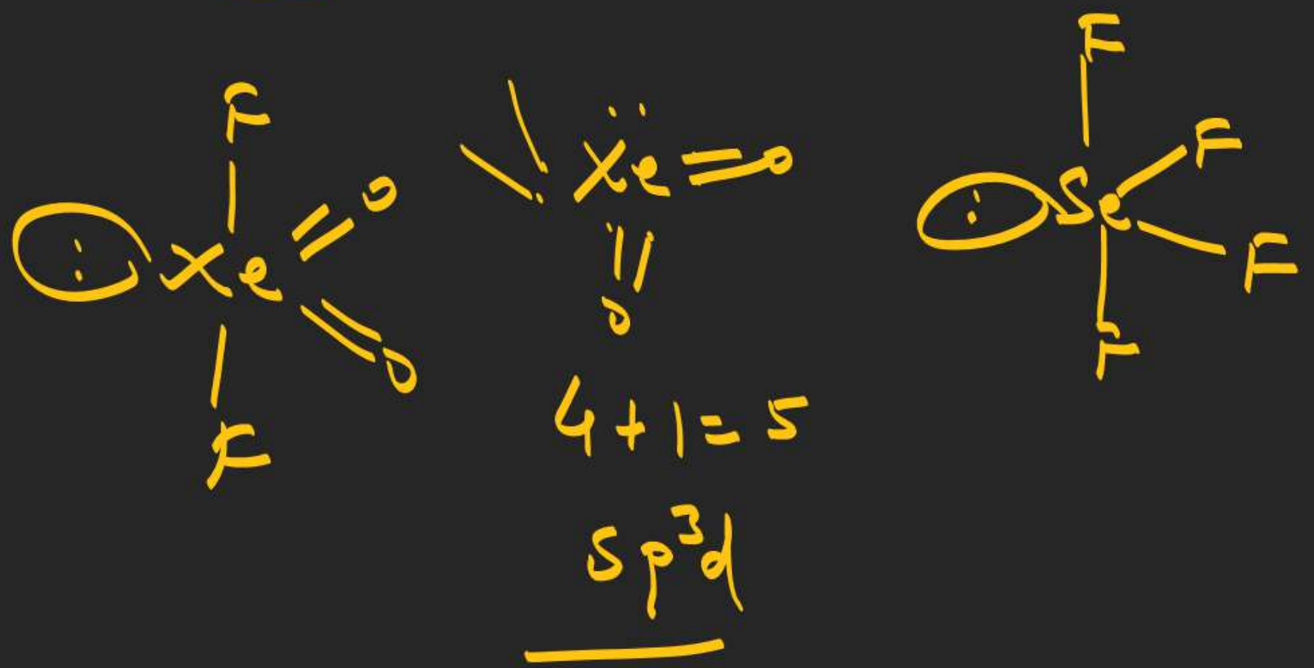
91. The pair of species with similar shape is?

(A) XeF_4 & SF_4

(B) PF_5 & IF_5

(C) XeO_2F_2 & SeF_4

(D) All pairs are iso-structural



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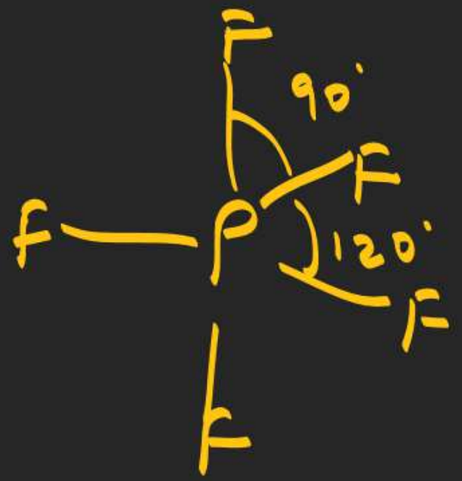
Chemical bonding

92. Which of the following molecule have all the bond angle equal is?

(A) PF_5 (B) SF_4 (C) NH_3 (D) None of these



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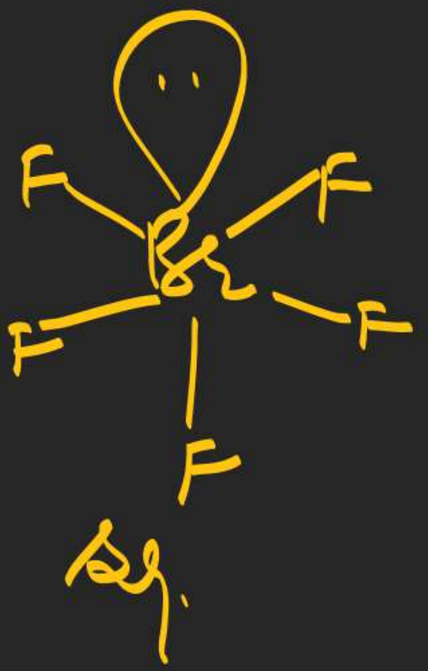
Chemical bonding

93. Which of the following is isostructural with $XeOF_4$?

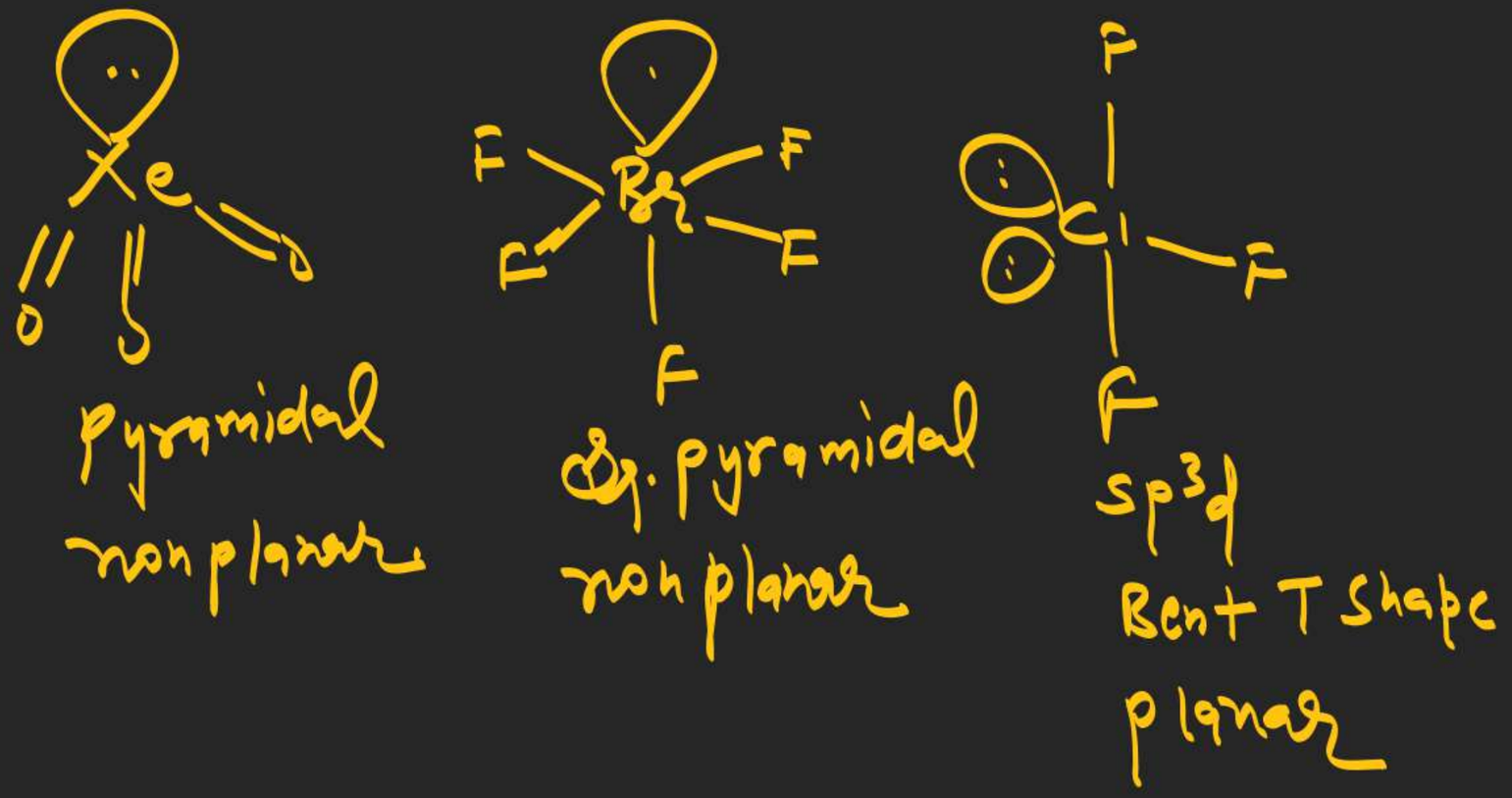
(A) BrF_5 (B) PCl_3F_2 (C) SeF_4 (D) XeO_2F_2



Chemical bonding

94. Which of the following is planar?

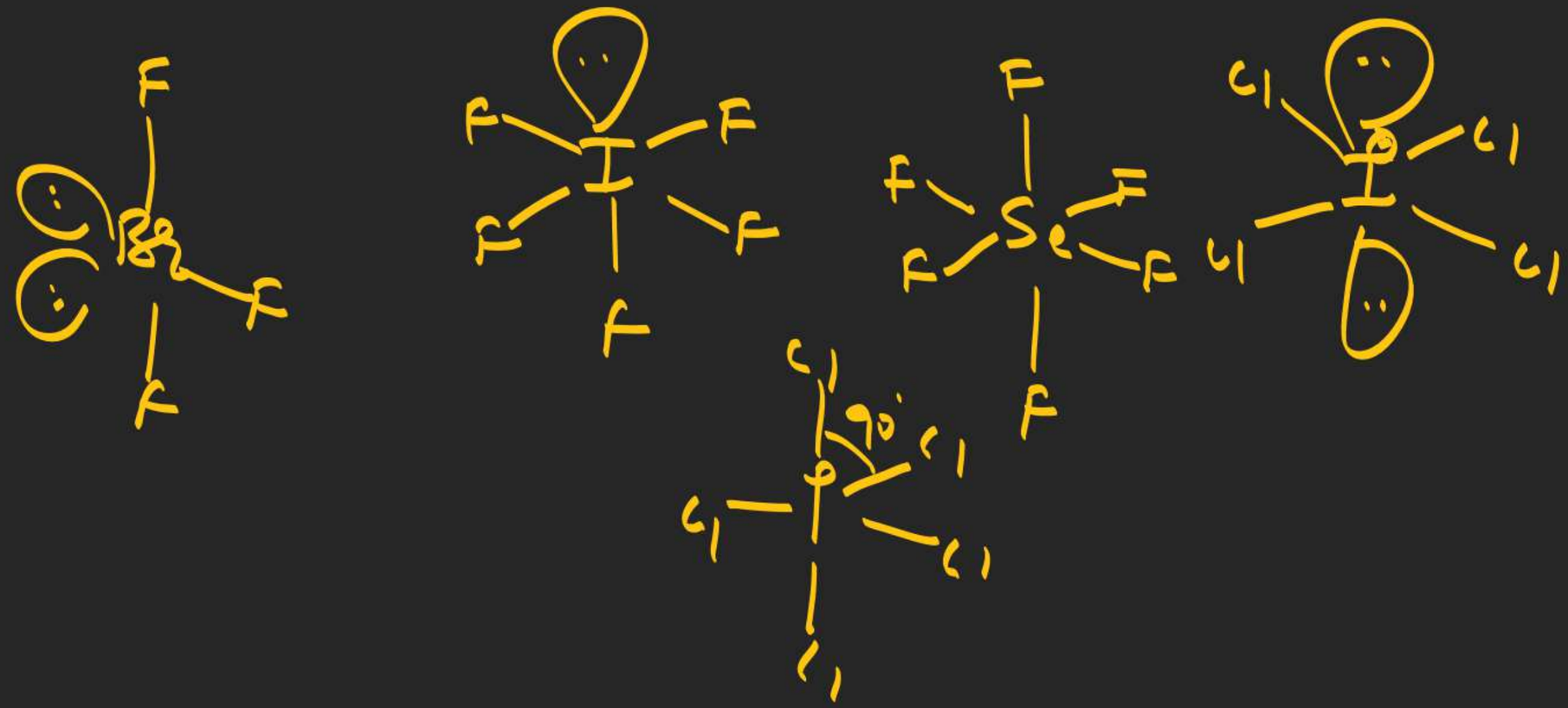
(A) XeO_3 (B) BrF_5 (C) ClF_3 (D) All are planar



Chemical bonding

95. The number of species given below having angles equal to 90° are ? BrF_3, IF_5, SeF_6, ICl_4^-, PCl_5

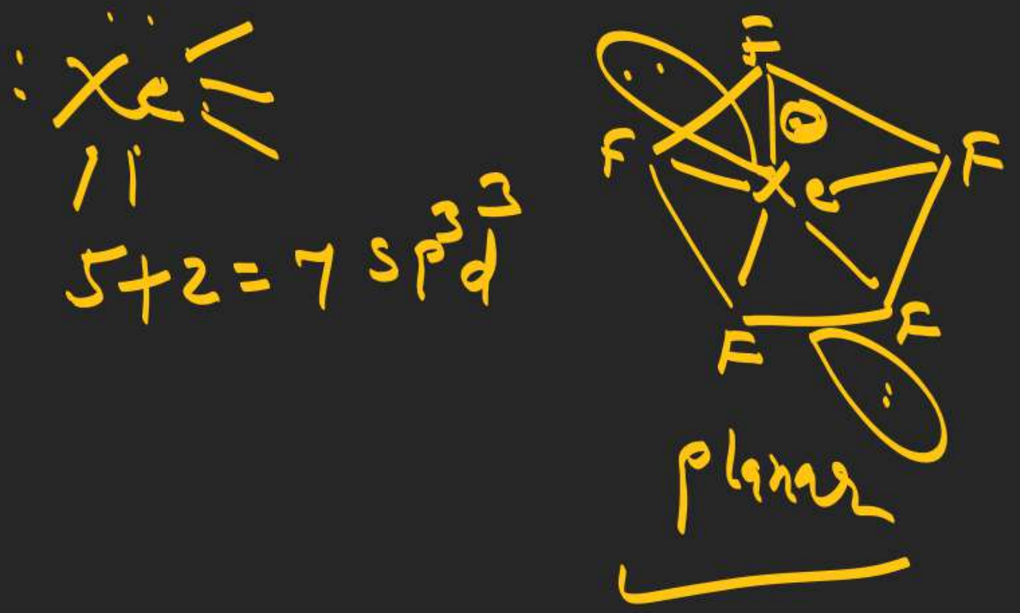
(A) 3 (B) 4 (C) 5 (D) 2



Chemical bonding

96. Which of the following molecule contain maximum number of atoms in one plane ?

(A) CCl_4 (B) PF_5 (C) XeF_5^- (D) SF_6



Chemical bonding

97. Which of the following specie is non-planar ?

(A) ClF_3 (B) H_3O^+ (C) NO_2^- (D) ClO_2^-

pyramidal
non planar

Chemical bonding

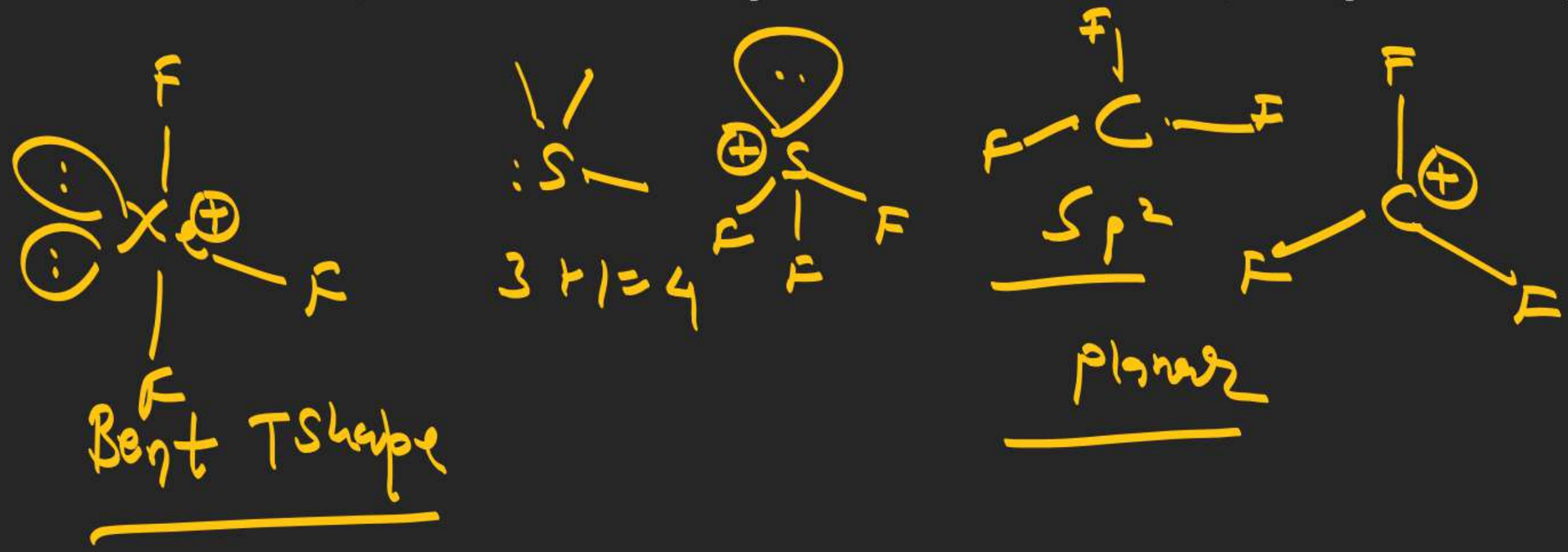
98. Molecular shape of XeF_3^+, SF_3^+ and CF_3^+ are :

(A) the same with 2, 1 and 0 lone pairs of electrons, respectively

(B) different with 2, 1 and 0 lone pairs of electrons, respectively

(C) different with 0,1 and 2 lone pairs of electrons, respectively

(D) the same with 2, 0 and 1 lone pairs of electrons, respectively



Chemical bonding

99. Which of the following statements is incorrect ?

(A) In H_2O, the bond angle is less than OF_2

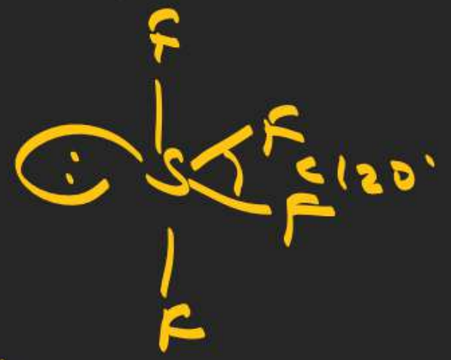
(B) In ClF_3, the axial $Cl-F$ bond length is larger than equatorial $Cl-F$ bond length.

(C) In SF_4, $F-S-F$ equatorial bond angle is not equal to 120° due to lone pair-bond pair repulsions.

(D) In ICl_4^-, bond angles is 90°

B.A ∝ E.N of C.A

B.A ∝ 1/E.N of S.A



Chemical bonding

100. According to VSEPR theory, in which species do all the atoms lie in the same plane ?

1. CH_3^+ 2. CH_3^-

(A) 1 only (B) 2 only (C) both 1 and 2 (D) neither 1 nor 2