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T·H·O	no of σ bond	no of l·p	e⁻ geometry	geometry/shape	B·A	example
5	5	0	 Trigonal bipyramidal (T·B·P)	 T·B·P	120° = 3 90° = 6 180 = 1	PCl_5
5	4	1	T·B·P	 See-saw	<120° <90°	SF_4
5	3	2	T·B·P	 Bent T-shape	<90°	ClF_3
5	2	3	T·B·P	 linear	180	XeF_2

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6 1 0 

Octahedral
or Square pyramidal

Octahedral
or
Square bipyramidal

90° = 12
180 = 3

SF_6

6 5 1 Oct. 

Square pyramidal

< 90° = 8

IF_5

6 4 2 Oct. 

90° = 4

XeF_4 Square planar

Square planar

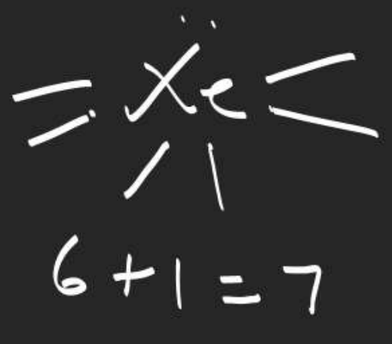
Que find the number of 90° angle in BrF_5

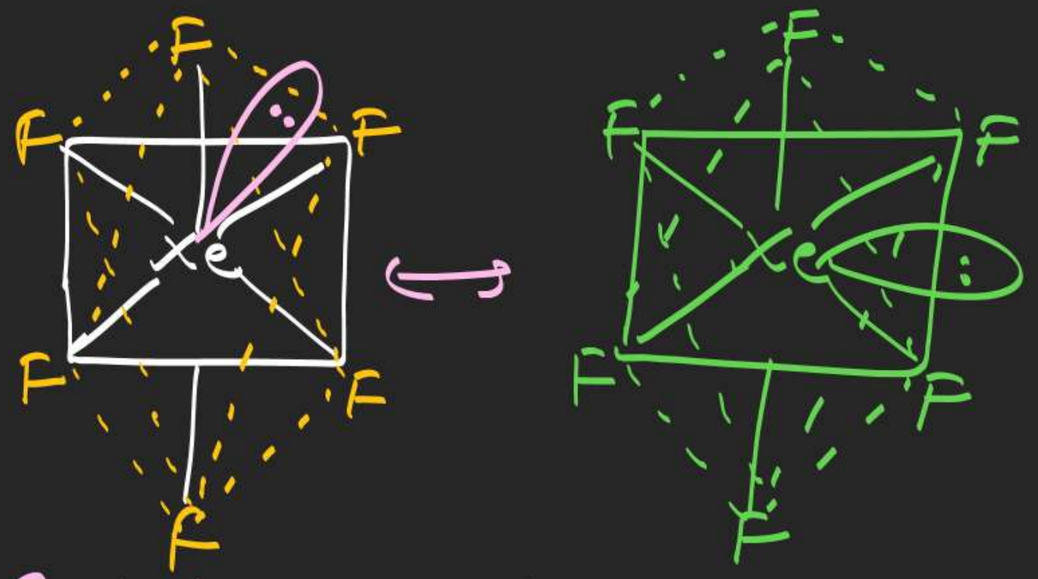
BrF_5

$\angle 90° = 8$

$90° = 0$

XeF_6





Capped octahedral

or

distorted octahedral

l.p is stereochemically active

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Solid state hybridisation

$PCl_{5(s)} \longrightarrow PCl_4^{\oplus} + PCl_6^{\ominus}$

$PBr_{5(s)} \longrightarrow PBr_4^{+} + Br^{\ominus}$

$XeF_{6(s)} \longrightarrow XeF_5^{+} + F^{\ominus}$

$I_{2(liq)} \longrightarrow I_3^{\oplus} + I_3^{\ominus}$

$Cl_2O_{6(s)} \longrightarrow ClO_2^{+} + ClO_4^{-}$

$N_2O_{4(s)} \longrightarrow NO^{+} + NO_3^{-}$

$N_2O_{5(s)} \longrightarrow NO_2^{+} + NO_3^{-}$

$PI_{5(s)} \longrightarrow PI_4^{+} + I^{\ominus}$

$I_2Cl_{6(liq)} \longrightarrow ICl_2^{+} + ICl_4^{\ominus}$

Q What is the hyb. of cation part of solid PCl_5

$PCl_{5(s)} \longrightarrow \underline{\underline{PCl_4^{\oplus}}} + PCl_6^{-}$

$4 + 0 = 4$

sp^3

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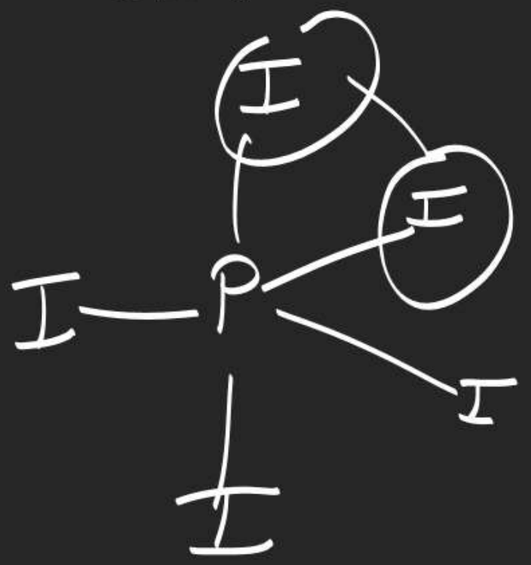
$PI_{5(s)}$ — exist — $PI_4^+ + I^\ominus$

$PI_{5(g)}$ — does not exist



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What is the shape of Cationic part of solid Cl_2O_6

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

2 + 1 = 3 sp^2

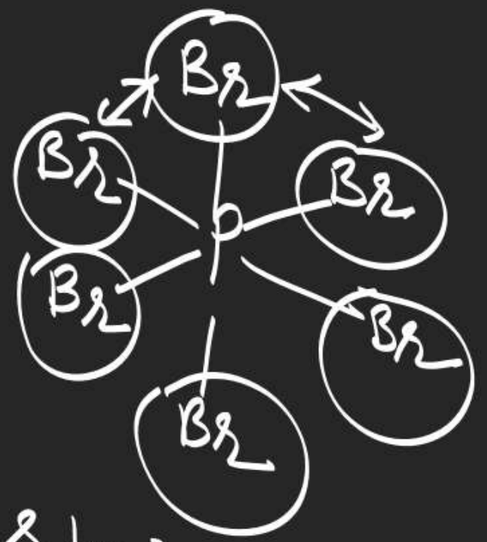
Bent | angular | V-shape

Ques Why $PBr_6^{\ominus}$ does not form in solid $PBr_{5(s)}$

Ans

$PCl_5 \longrightarrow PCl_4^{+} + PCl_6^{\ominus}$

$PBr_5 \longrightarrow PBr_4^{+} + Br^{\ominus}$



Steric crowding

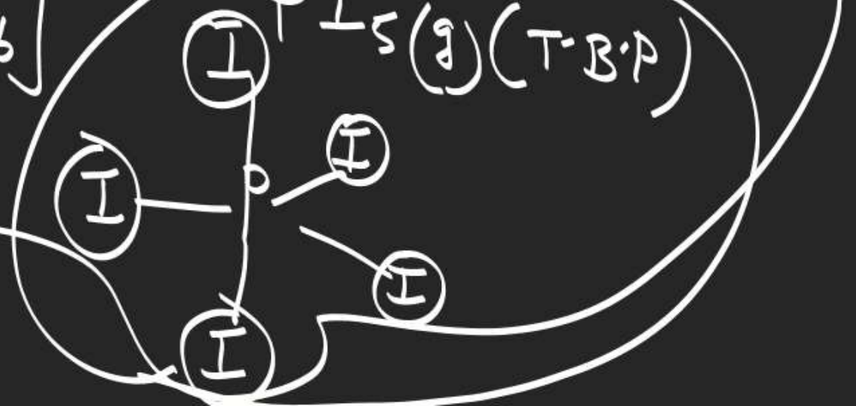
donot exist due to steric crowding

$PBr_6^{\ominus}$ SCl_6 ClI_7 ClF_7 $BCl_4^{\ominus}$

SBr_6

SI_6

$[SiCl_6]^{-2}$



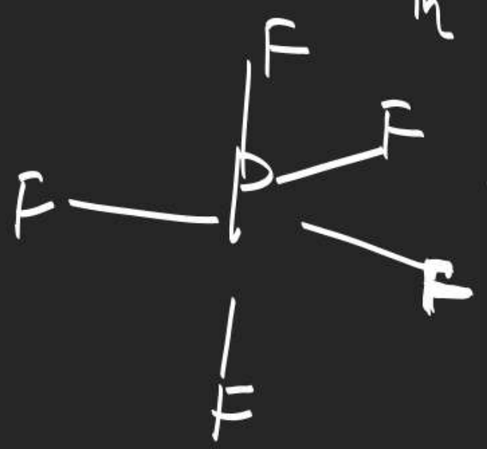
PI_5 (g) (T.B.P)

Ques. $PCl_{5(s)}$

$PBr_{5(s)}$

$PI_{5(s)}$

or PF_5 → exist as T·B·p in solid liq. and gas



T·B·p (Trigonal bipyramidal)

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Qué. Which of the following molecule has phase independend Geometry

(1) PCl_5

(2) PBr_5

(3) PI_5

(4) PF_5

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7 7 0

Pentagonal bipyramidal

P·B·P

$90° = 10$
$72 = 5$
$180° = 1$

IF_7

7 6 1

P·B·P

$\begin{matrix} < 72 \\ < 90 \end{matrix}$

Pentagonal pyramidal

7 5 2

P·B·P

$72 = 5$

$XeF_5^{\ominus}$

Pentagonal planar

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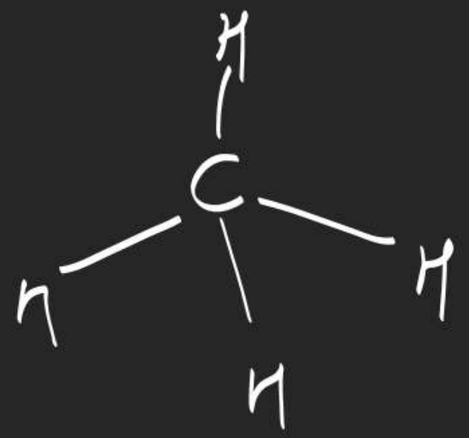
ans.



109.5 = 6

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