

Q → What is hybridization? Give example of each of  $sp^2$  and  $sp^3d^2$  hybridization.

Q → Bond angle decreases from  $NH_3$  ( $107.3^\circ$ ) to  $NF_3$  ( $102.1^\circ$ ) and from  $H_2O$  ( $104.5^\circ$ ) to  $OF_2$  ( $103.2^\circ$ ). Explain this decrease.

Q → Bond angle decreases from  $NH_3$  ( $107.3^\circ$ ) to  $PH_3$  ( $93.2^\circ$ ) to  $AsH_3$  ( $91.5^\circ$ ). Explain giving reasons.

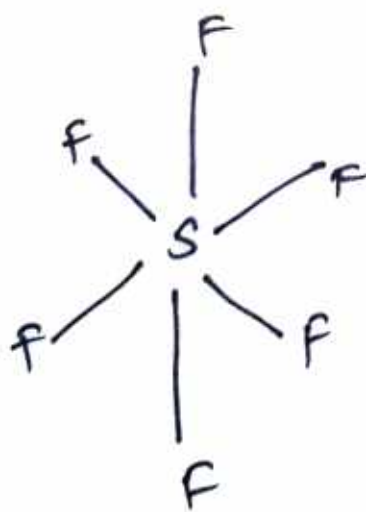
Q → How does Pauling - Slater theory explain the directional character of covalent bond. (2)

Q → Structure of  $SF_6$  on the basis of hybridisation.

Sol<sup>n</sup> → The central atom = 'S'

G.S.  $S \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^4$   $\uparrow\downarrow$   $\uparrow\uparrow\uparrow$

E.S.  $\rightarrow 1s^2 2s^2 2p^6$   $\uparrow$   $\uparrow\uparrow\uparrow$   $\uparrow\uparrow$   $\square$   $\square$   $\square$   
 $sp^3d^2$



↔ Octahedral.

Q → Using VSEPR theory, predict the structure of  
 $IF_5$  &  $PF_5$ . (2) ,  $SO_2$ ,  $NH_3$ ,  $XeF_4$ .

Q →  $Z = \frac{1}{2} (\text{no. of valence } e^- \text{ on c.a.} + (\ominus \text{ve charge})$   
 $- (\oplus \text{ve charge}) + \text{no. of monovalent atom}$

$Z = \text{l.p.} + \text{b.p.} = \text{Total } e^- \text{ pair.}$

So,  $\text{l.p.} = Z - \text{b.p.}$

Q → Predict the structure of  $XeF_6$  molecule using  
VSEPR theory. (2) ,  $ICl_4^-$ ,  $ClF_3$ ,  $SF_4$ ,  $XeOF_4$ .

Q → Write two postulates of VSEPR theory.

Q → Explain the structure of  $SF_6$  on the basis of  
hybridisation. (3)

Q → The bond angles of  $PF_3$ ,  $PCl_3$ ,  $PBr_3$  and  $PI_3$   
are  $97.8^\circ$ ,  $100.3^\circ$ ,  $101.5^\circ$  and  $102^\circ$  respectively.

Explain. (2)

Q → Which of the following molecules has the smallest  
bond angle?

(i)  $BeF_2$  (ii)  $SF_6$  (iii)  $BF_3$  (iv)  $NH_3$

Q → The hybridization involved in  $H_2O$  is -

(i)  $sp^2$  (ii)  $sp^3$   
(iii)  $sp^2d$  (iv)  $sp^3d^2$

Q → Structure of  $\text{XeF}_6$ .

Soln →  $\text{Xe} \rightarrow$  valence  $e^-s = 8$

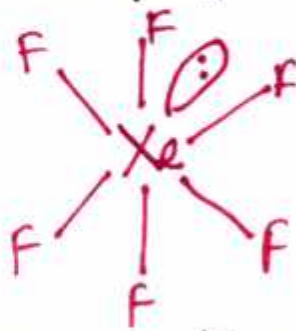
6  $e^-s$  involved in 6-bonding with F-atoms and remaining two  $e^-s$  as lone pair.  $\text{Xe}$

So, b.p. = 6

L.p. = 1

---

Total Z = 7



So, according to VSEPR theory, the structure should be pentagonal bipyramidal.

But, due to the presence of one lone pair, bp-lp repulsion occurs, so, the regular structure is distorted and the structure is distorted octahedron or capped octahedron as shown below.