Chemistry Study Materials for Class 12

(NCERT Based Reasoning of Chapter -07)

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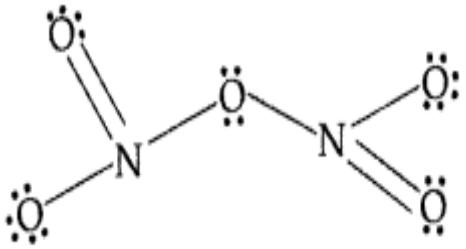
P – block elements

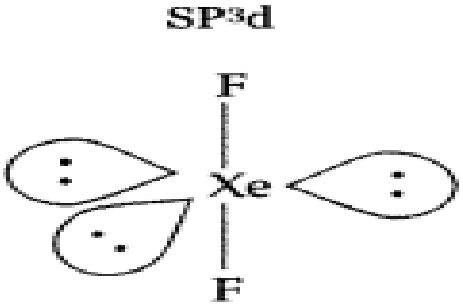
Question 68: Draw the structures of the following molecules :(i) N_2O_5 (ii) XeF_2

Answer: (i) N_2O_5:



Planar

(ii) XeF_2 :



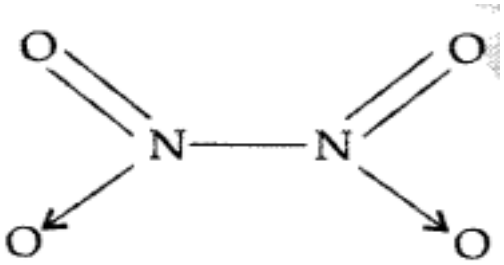
Shape : Linear, Angle : F-Xe – F > 90°

Question 69: Explain the following:

(a) NO_2 readily forms a dimer. (b) BiClj is more stable than $BiCl_5$.

Answer:

(a) NO_2 contains 7 + 2 × 8 i.e. 23 odd electrons. In the valence shell N has seven electrons and hence less stable. To acquire stability it dimerizes to form N_2O_4



(b) $BiCl_3$ is more stable than $BiCl_5$ due to inert pair effect because as we move down the group, the stability of +3 oxidation state increases and of +5 decreases.

Question 70: Complete the following chemical equations:

(i) $Ca_3P_2 + H_2O \rightarrow$ (ii) $Cu + H_2SO_4$ (cone.) $\rightarrow$

Answer:

(i) $Ca_3P_2 + 6H_2O \rightarrow 2PH_3 + 3Ca(OH)_2$

(ii) $Cu + 2H_2SO_4$ (cone.) $\rightarrow CuS0_4 + 2H_2O + SO_2$

Question 71: Arrange the following in the order of property indicated against each set :

(i) HF, HCl, HBr, HI – increasing bond dissociation enthalpy.

(ii) H_2O, H_2S, H_2Se, H_2Te – increasing acidic character.

Answer: (i) HI < HBr < HCl < HF (ii) $H_2O < H_2S < H_2Se < H_2Te$

Question 72: Complete the following equations :

(i) $P_4 + H_2O \rightarrow$ (ii) $XeF_4 + O_2F_2 \rightarrow$

Answer:

(i) $P_4 + 6H_2O \rightarrow 2PH_3 + 2H_3PO_3$

(ii) $XeF_4 + O_2F_2 \xrightarrow{143K} XeF_6 + O_2$

Question 74.

Complete the following equations:

(i) $Ag + PCl_5 \rightarrow$ (ii) $CaF_2 + H_2SO_4 \rightarrow$

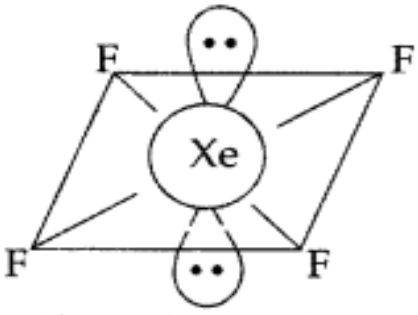
Answer:

(i) $Ag + PCl_5 \rightarrow 2AgCl + PCl_3$

(ii) $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

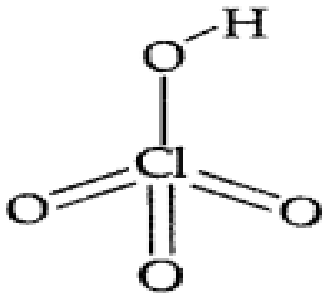
Question 75: Draw the structures of the following :(i) XeF_4 (ii) $HClO_4$

Answer: (i) XeF_4:



Shape : Square planar

(ii) $HClO_4$:



Question 76: Complete the following equations :

(i) C + conc. $H_2SO_4 \rightarrow$ (ii) $XeF_2 + H_2O \rightarrow$

Answer:

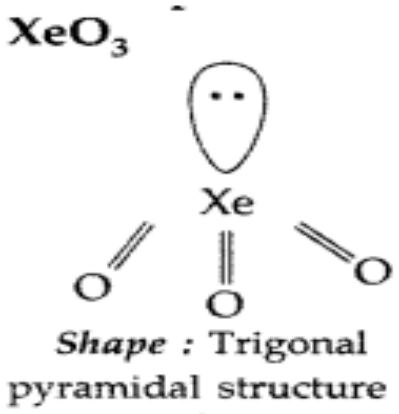
$$(i)\ C + 2H_2SO_4\ (conc.) \longrightarrow CO_2 + 2SO_2 + 2H_2O$$

$$(ii)\ \underset{\text{Xenondifluoride}}{2XeF_2(s)} + 2H_2O(l) \longrightarrow \underset{\text{Xenon}}{2Xe(g)} + \underset{\text{Hydrogen fluoride}}{4HF(aq)} + O_2(g)$$

Question 77: Draw the structures of the following :(i) XeO_3 (ii) H_2SO_4

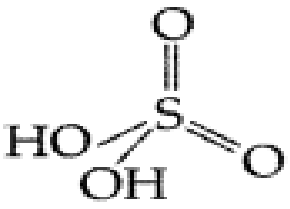
Answer:

(i) XeO_3 :



Shape : Trigonal pyramidal structure

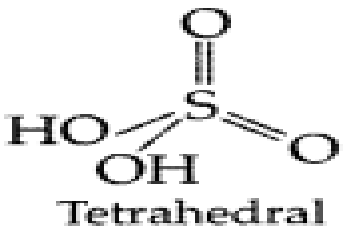
(ii) H_2SO_4:



Tetrahedral

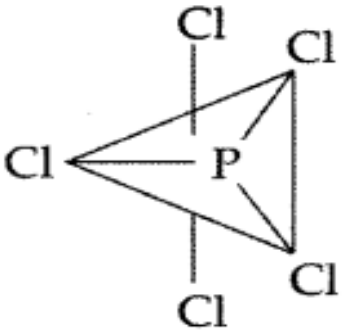
Question 78: Draw the structure of each of the following:(i) H_2SO_4 (ii) Solid PCl_5

Answer: (i) H_2SO_4:



Tetrahedral

(ii) PCl_5 (s):



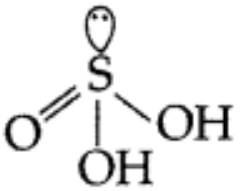
Sp^3d hybridisation

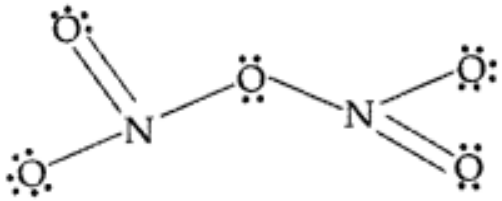
Shape : Trigonal bipyramidal

Question 79: Draw the structures of the following compounds :(i) H_2SO_3(ii) N_2O_5

Answer:

(*i*) H_2SO_3 (*ii*) N_2O_5





Question 80: Complete the following chemical equations :

(i) PCl_5 Heat−→−− (ii) $NaHCO_3 + HCl \rightarrow$

Answer:

(*i*) $PCl_5 \overset{\Delta}{\rightleftharpoons} PCl_3 + Cl_2$

(*ii*) $NaHCO_3 + HCl \longrightarrow NaCl + H_2O + CO_2$

Question 81: Complete the following chemical equations :

(i) $SO_2 + MnO_4^- + H_2O \rightarrow$ (ii) F_2 (g) + H_2O (l) →

Answer:

(*i*) $5SO_2 + 2MnO_4^- + 2H_2O \longrightarrow 5SO_4^{2-} + 2Mn^{2+} + 4H^+$

(*ii*) Fluorine oxidises H_2O to O_2 and O_3

$$2F_2(g) + 2H_2O(l) \longrightarrow 4H^+(aq) + 4F^-(aq) + O_2(g)$$

$$3F_2(g) + 3H_2O(l) \longrightarrow 6H^+(aq) + 6F^-(aq) + O_3(g)$$

Question 82: Complete the following chemical reaction equations :

(*i*) $KClO_3 \xrightarrow[MnO_2]{Heat}$ **(*ii*)** $XeF_4 + H_2O \rightarrow$

Answer:

(*i*) $2KClO_3 \xrightarrow[MnO_2]{Heat} 2KCl + 3O_2$

(*ii*) $6XeF_4 + 12H_2O \longrightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$

Question 83: Complete the following chemical equations :

(*i*) $P_4 + SOCl_2 \rightarrow$

(*ii*) F_2 **(Excess)** $+ Cl_2 \xrightarrow{300^\circ C}$

Answer:

(*i*) $P_4 + 8SOCl_2 \longrightarrow 4PCl_3 + 4SO_2 + 2S_2Cl_2$

(*ii*) $3F_2$ (excess) $+ Cl_2 \xrightarrow{300^\circ C} 2ClF_3$

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