

Daily Tutorial Sheet 4

JEE Advanced (Archive)

46.(AD) $NH_4NO_3 \xrightarrow{\Delta} N_2O + 2H_2O$

$$\textit{NH}_2\textit{OH} \cdot \textit{HCl} + \textit{NaNO}_2 \\ \\ \longrightarrow \textit{N}_2\textit{O} + \textit{NaCl} + 2\textit{H}_2\textit{O}$$

47. $2H_3PO_2 \xrightarrow{\text{heat}} PH_3 + H_3PO_4$

48. NaBrO₃ + F₂ + 2NaOH \longrightarrow NaBrO₄ + 2NaF + H₂O

49. NaClO₃ + SO₂ + $10H^+$ \rightarrow NaCl + S + $5H_2O$

50. Since nitrogen has a small atomic size and a high value of electronegativity so it can form hydrogen bonds and thus association occurs in case of NH₃.

In PH_3 , P atom has a large size and lower value of electronegativity so hydrogen bonding is not possible and thus no association occurs in PH_3 .

51. H₃PO₃ (orthophosphorous acid) is dibasic as is clear from its structure which contains two –OH groups.

52.(AD) NH_3 and CF_2Cl_2 (Freon-12) are used as refrigerants.

53. The two resonating structures are :

$$\mathbf{\dot{N}} = \mathbf{\dot{N}} = \mathbf{O} \mathbf{:} \longrightarrow \mathbf{\dot{N}} = \mathbf{\dot{N}} = \mathbf{\dot{O}} \mathbf{:}$$

54. $15\text{CaO} + 4\text{P}_4 \xrightarrow{\Delta} 5\text{Ca}_3\text{P}_2 + 3\text{P}_2\text{O}_5 \uparrow$

$$\frac{\text{Ca}_{3}\text{P}_{2} + 6\text{H}_{2}\text{O} \rightarrow 3\text{Ca}(\text{OH})_{2} + 2\text{PH}_{3} \uparrow] \times 5}{15\text{CaO} + 4\text{P}_{4} + 30\text{H}_{2}\text{O} \rightarrow 15\text{Ca}(\text{OH})_{2} + 3\text{P}_{2}\text{O}_{5} + 10\text{PH}_{3} \uparrow}$$

55. $CaSO_4 + 2NH_3 + CO_2 + H_2O \rightarrow CaCO_3 \downarrow + (NH_4)_2SO_4$

56.
$$\operatorname{NaNO}_2 + \operatorname{Zn} + \operatorname{NaOH} \rightarrow \operatorname{Na}_2 \operatorname{ZnO}_2 + \operatorname{NH}_3 + \operatorname{H}_2 \operatorname{O}$$

57.(D) In $S_2O_7^{2-}$, there is no S-S bond.

$$\begin{bmatrix} 0 & 0 & 0 \\ || & || & || \\ -0 - S - 0 - S - 0 - \\ || & || & || \\ 0 & 0 & 0 \end{bmatrix}^{2-}$$

In it there is S-O-S bond. In all other given ionic compounds we find S-S bond.

$$\begin{bmatrix} O & O \\ || & || & || \\ -O - S - S - O - \end{bmatrix}^{2-} ; \begin{bmatrix} O & O \\ || & || & || \\ -O - S - S - O - \end{bmatrix}^{2-} ; \begin{bmatrix} O & O \\ || & || & || \\ -O - S - O - \end{bmatrix}^{2-} \\ (S_2O_4^{2-}) & (S_2O_5^{2-}) & (S_2O_3^{2-}) \end{bmatrix}$$



58. Self ionisation of NH_3 occurs of as follows:

$$NH_3 + NH_3 \longrightarrow NH_4^+ + NH_2^-$$

When $\mathrm{NH_4Cl}$ is added to ammonia it increases the $[\mathrm{NH_4^+}]$ and so $\mathrm{NH_4Cl}$ acts as an acid in liquid ammonia.

59.
$$4KMnO_4 + 2H_2O \rightarrow 4MnO_2 + 4KOH + 3O_2$$

$$4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O$$

60.
$$P + 5HNO_3 \xrightarrow{I_2} H_3PO_4 + 5NO_2 + H_2O$$

Solution | Workbook-6 36 p-Block Elements-II