

Daily Tutorial Sheet 1

JEE Advanced (Archive)

- 1.(D)** For drying, quick lime is used as it does not react with ammonia but reacts readily with moisture.
- 2.(A)** $\text{NO} = 7 + 8 = 15$ and $\text{O}_2 = 8 + 8 = 16$
 From molecular mass, it is clear that NO is lighter than O_2 .
- 3.** (i) HBr is a reducing agent. Therefore, it reduces H_2SO_4 to SO_2 . So can not be prepared by conc. H_2SO_4 action on NaBr.
 (ii) Blue litmus turns red because of the acidic nature of HClO, later on, colour is decolourised as it is also an oxidising agent.
- 4. (A)** (i) NO_2 gas is evolved.

$$\text{Sn} + 4\text{HNO}_3 \longrightarrow \text{H}_2\text{SnO}_3 + 4\text{NO}_2 + \text{H}_2\text{O}$$
 (ii) Silver sulphate is formed and SO_2 gas is evolved.

$$2\text{Ag} + 2\text{H}_2\text{SO}_4 \longrightarrow \text{Ag}_2\text{SO}_4 + \text{SO}_2 + 2\text{H}_2\text{O}$$
 (iii) Hydrogen is evolved and sodium metaaluminate is formed.

$$2\text{Al} + 2\text{NaOH} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaAlO}_2 + 3\text{H}_2$$
 (iv) Nitrogen gas is evolved.

$$(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \longrightarrow \text{N}_2 + \text{Cr}_2\text{O}_3 + 4\text{H}_2\text{O}$$
 (v) Sulphur is precipitated and KMnO_4 is decolourised.

$$2\text{KMnO}_4 + 3\text{H}_2\text{SO}_4 + 5\text{H}_2\text{S} \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 5\text{S} + 8\text{H}_2\text{O}$$
- (B)** (i)
$$\text{Al}_2\text{O}_3 + 3\text{C} + 3\text{Cl}_2 \xrightarrow{\text{heat}} 2\text{AlCl}_3 + 3\text{CO}$$
 (ii)
$$\text{Ca}(\text{OH})_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$$
 (iii)
$$\text{SnO}_2 + 2\text{C} \longrightarrow \text{Sn} + 2\text{CO}$$
 (iv)
$$2\text{NaCl} + 2\text{H}_2\text{SO}_4 + \text{MnO}_2 \xrightarrow{\text{heat}} \text{Na}_2\text{SO}_4 + \text{MnSO}_4 + 2\text{H}_2\text{O} + \text{Cl}_2$$
 (v)
$$3\text{Cu} + 8\text{HNO}_3 \longrightarrow 3\text{Cu}(\text{NO}_3)_2 + 4\text{H}_2\text{O} + 2\text{NO}$$
- 5.(C)**
$$\underset{\substack{\text{Nitric oxide} \\ \text{(colourless)}}}{\text{NO}} + \text{O}_2 \longrightarrow \underset{\substack{\text{Nitrogen dioxide} \\ \text{(reddish brown coloured)}}}{\text{NO}_2}$$
- 6.** (i) Concentrated nitric acid partially decomposes to give NO_2 which gas dissolved in nitric acid. As NO_2 has a brownish red colour, it imparts colour to the nitric acid.
 (ii) In contact with moisture in air, bleaching powder releases chlorine. Therefore, on keeping it in an open bottle for a long time it loses its capacity to bleach.

$$\text{CaOCl}_2 + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{Cl}_2 \uparrow$$
- 7.(A)** Due to highest bond dissociation energy.
- 8.(C)**
$$\overset{0}{\text{P}_4} + 3\text{NaOH} + 3\text{H}_2\text{O} \longrightarrow \overset{+3}{\text{PH}_3} + 3\overset{-1}{\text{NaH}_2\text{PO}_2}$$

 It is redox reaction
 (i) Oxidation number increased during oxidation reaction and decreases during reduction reaction.
 (ii) In a neutralisation reaction acids and bases react together to form salt and water.

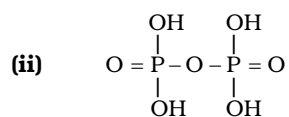
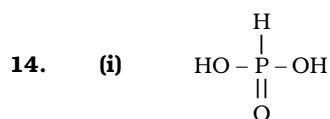
9.(A) \therefore Cl_2 is more reactive than bromine.

10.(D) All are colourless gases.

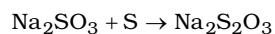
11.(C)

12.(D) Due to the small size of F, HF is a poor reducing agent and cannot reduce KMnO_4 , H_2SO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$.

13. In S_8 we have van der Waals forces to hold the rings. Due to this sulphur has a melting point of 119°C . When sulphur melts, the van der Waals forces are overcome and the S_8 rings slip and roll over one another. It gives rise to a clear mobile liquid. Above 160°C , the S_8 ring starts to open up and form long chains which get tangled with each other, and it gradually increases the viscosity of sulphur.



15. By boiling Na_2SO_3 solution with powder of sulphur in absence of air.



The excess of sulphur is removed by filtration is evaporated to get crystals of sodium thiosulphate.