- 3. Discuss the action of phosphorus with (i) Chlorine, (ii) Sodium hydroxide, (iii) Concentrated nitric acid.
  - (i) **Reaction with chlorine:** White phosphorus spontaneously catches fire in chlorine forming phosphorus trichloride and pentachloride while the red phosphorus catches fire in chlorine only on heating.

$$P_4 + 6Cl_2 \longrightarrow 4 PCl_3$$
Phosphorus trichloride
$$P_4 + 10Cl_2 \longrightarrow 4 PCl_5$$

Phosphorus pentachloride

(ii) Reaction with alkalis: White phosphorus reacts with hot solutions of caustic soda or caustic potash giving phosphine gas.

(iii) Reaction with acids: When white phosphorus is heated with coheenfrated nitric acid, it is oxidized to orthophosphoric acid H<sub>3</sub>PO<sub>4</sub>.

P + 5HNO<sub>3</sub> 
$$\longrightarrow$$
 HJP  $^4$   $^4$  5NO<sub>2</sub>  $^{\circ}$  H<sub>2</sub>O  $^{\circ}$  thophosphoric Acid  $^{\circ}$  Explain with equations who happens when (i) sulphur is heated with carbon, (ii)

- 4. Explain with equations what happens when (i) sulphur is heated with carbon, (ii) hydrogen gas is passed through boiling sulphur, (iii) sulphur is treated with hot concentrated sulphuric acid, (iv) sulphur is heated with concentrated nitric acid.
  - (i) **Reaction of sulphur with carbon;** on heating to a high temperature carbondisulphide is formed.

$$C + 2S \longrightarrow CS_2$$
 carbon sulphur carbon disulphide

(ii) When hydrogen gas is passed through boiling sulphur, a foul smelling gas hydrogen sulphide is formed.

$$H_2$$
 + S  $\longrightarrow$   $H_2$  S hydrogen sulphide

(iii) Reaction with sulphuric acid: Hot and concentrated sulphuric acid oxidises sulphur to sulphur dioxide.

$$S + 2 H_2SO_4 \longrightarrow 3 SO_2 + 2H_2O$$
 sulphur sulphuric acid sulphur dioxide water (hot and cone)