SELF ASSESSMENT TEST SOLUTIONS

1. (a) Metals in low reactivity series are obtained by just heating their oxides alone.

   Eg: Mercury is obtained by heating mercurous oxide.

   Metals high up in reactivity series are obtained by electrolytic reduction.

   Eg: Sodium is obtained by the electrolysis of their molten chlorides.

   (c) (i) It is highly exothermic.

   (ii) Metal starts floating.

2. (a) (i) Ionic bond

   (ii) AB_2

   (c) Only in molten state it can split into ions and not in solid state. Ions conduct electricity

   (d) It is beause of strong inter molecular force of attraction between the bonds.

3. (i) Metal – Sodium.

   (ii) $4Na + O_2 \rightarrow 2Na_2O$ $Na_2O + H_2O \rightarrow 2NaOH$

   (iii) Electrolysis of molten metal chloride (NaCl).

   At cathode $\rightarrow$ Na is deposited.

   At Anode $\rightarrow$ Cl_2 is liberated.

   At cathode : $Na^+ + e^- \rightarrow Na$

   At Anode : $2Cl^- \rightarrow Cl_2 + 2e^-$

4. In nature metals are found in free and combined forms, i.e. as their compounds.

   (i) All metals combine with oxygen and form metal oxides.

   Eg: When copper is heated in air it combines with oxygen and forms copper oxide.

   $2Cu + O_2 \rightarrow 2CuO$

   (ii) Metals react with water and produce metal oxide and hydrogen gas.

   $2K + 2H_2O \rightarrow 2KOH + H_2$

   (iii) Metals react with acids to give a salt and hydrogen gas.

   Eg : Magnesium reacts with dilute hydrochloric acid and forms magnesium chloride and water.

   $Mg + 2HCl \rightarrow MgCl_2 + H_2$

5. (a) The metal X is aluminium.

   $2Al + Fe_2O_3 \rightarrow Al_2O_3 + 2Fe$

   (b) Aluminium oxide is an amphoteric oxide as it reacts with both acids and bases to

produce salt and water. Another amphoteric oxide is ZnO.

(c) Copper and Tin.

6. (a) The extraction of metals from their ores and then refining them for use is known as metallurgy.

(b) When cinnabar is heated in air, it is first converted into HgO. It is then reduced to mercury on further heating.

(i) $2HgS_{(s)} + 3O_{2(g)} \xrightarrow{heat} 2HgO_{(s)} + 2SO_{2(g)}$

$2HgO_{(s)} \xrightarrow{heat} 2Hg_{(l)} + O_{2(g)}$

(ii) Similarly copper can be obtained from Cu_2S by just heating in air.

$2Cu_2S + 3O_2 \xrightarrow{heat} 2Cu_2O_{(s)} + 2SO_{2(g)}$

$2Cu_2O_{(s)} + Cu_2S \xrightarrow{heat} 6Cu_{(s)} + SO_{2(g)}$