1. Write names.

Question 1.

a. Alloy of sodium with mercury.

Answer:

Silver amalgam.

b.Molecular formula of common ore of aluminium.

Answer:

$Al_2O_3.nH_2O$

c. The oxide that forms salt and water by reacting with both acid and base.

Answer:

Aluminium oxide (Al_2O_3).

d. device used for grinding an ore.

Answer:

The device used for grinding an ore is grinding mill.

e. The nonmetal having electrical conductivity.

Answer:

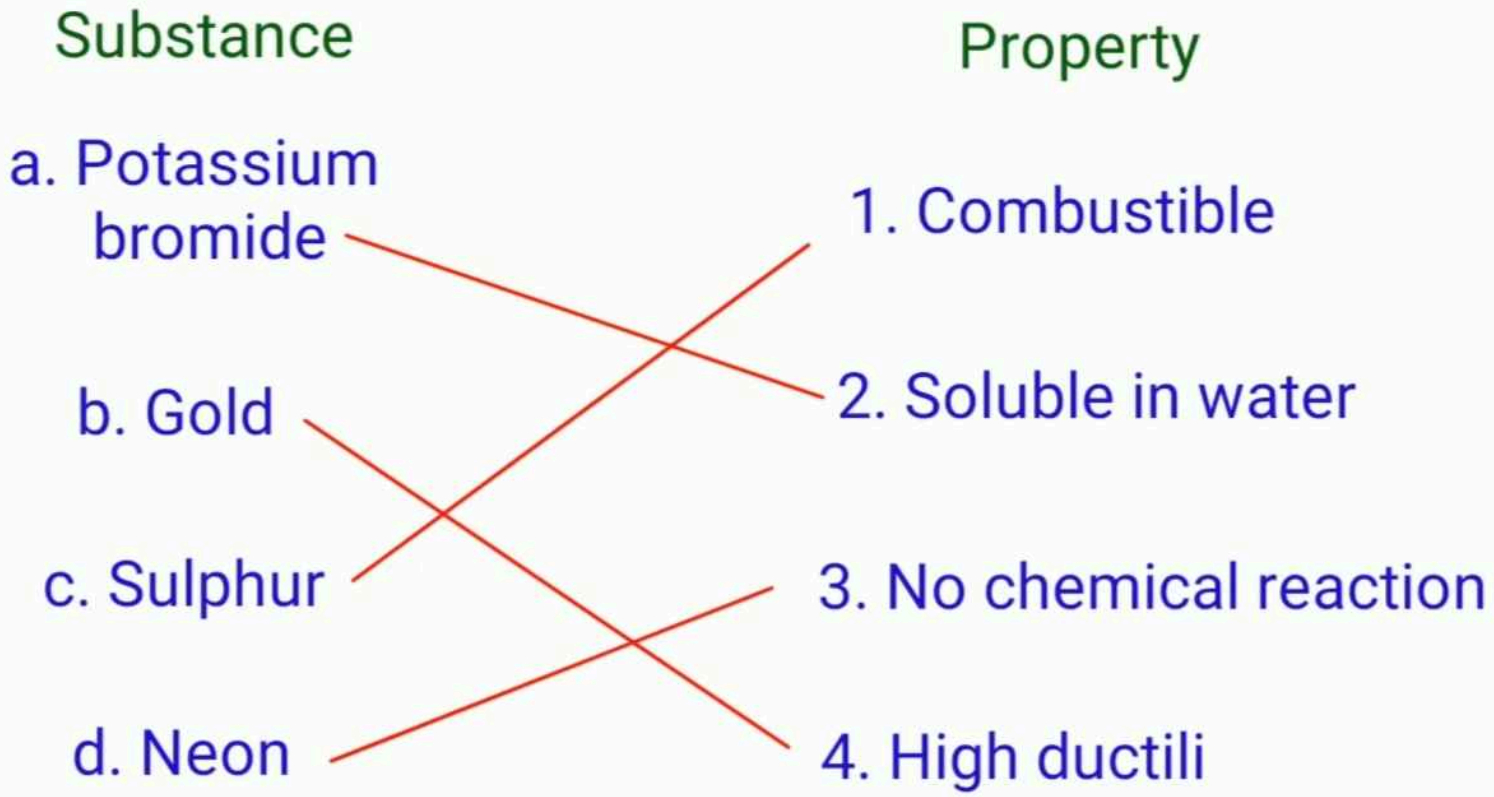
Graphite having electrical conductivity.

f. The reagent that dissolves noble metals.

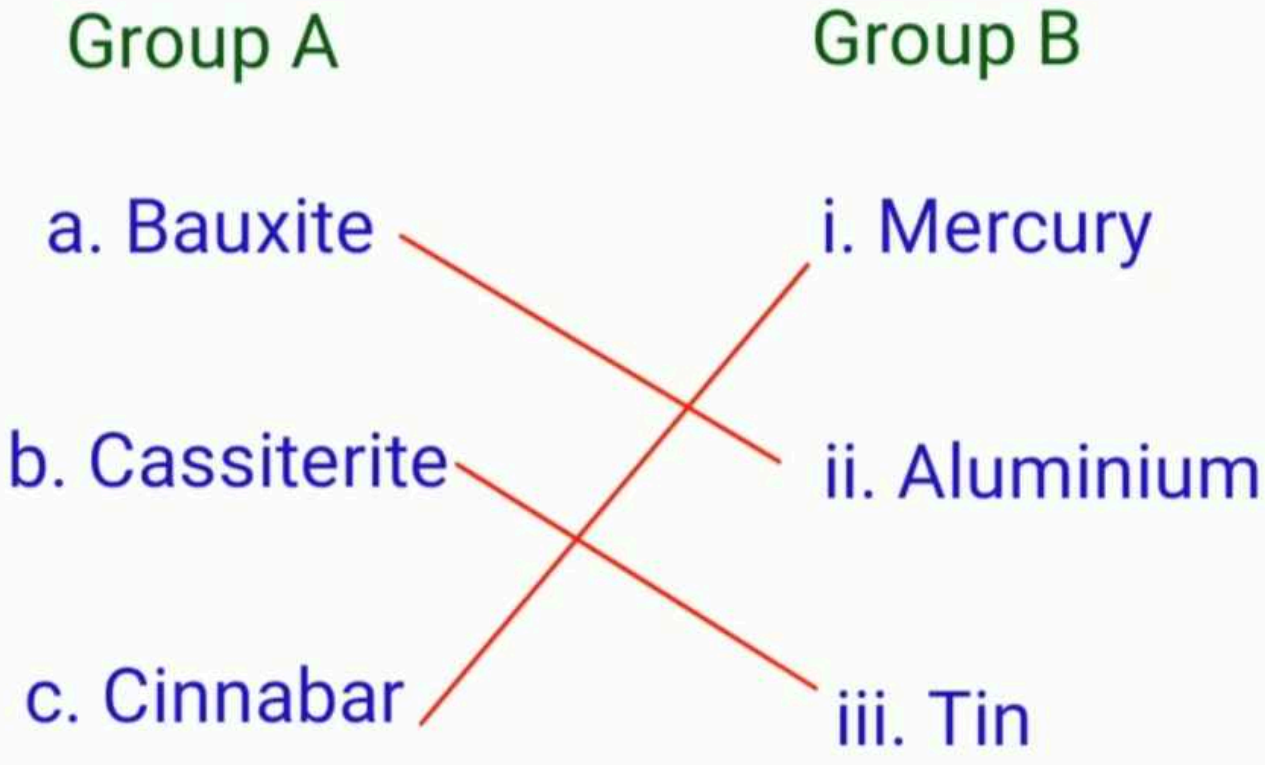
Answer:

Aqua regia is the reagent that dissolves noble metals like gold and platinum.

2. Make pairs of substances and their properties.


Substance
Property
a. Potassium bromide
b. Gold
c. Sulphur
d. Neon
1. Combustible
2. Soluble in water
3. No chemical reaction
4. High ductili

3. Identify the pairs of metals and their ores from the following.


Group A
Group B
a. Bauxite
b. Cassiterite
c. Cinnabar
i. Mercury
ii. Aluminium
iii. Tin

4. Explain the terms.

a. Metallurgy

The process used for extraction of metals in their pure form from their ores, then metals are further purified by different methods of purification. All the process is called metallurgy.

b. Ores

The minerals from which metals are extracted profitably and conveniently are called ores.
Examples : Bauxite, Cinnabar.

c. Minerals

The naturally occurring compounds of metals along with other impurities are known as minerals.

d. Gangue

Ores contain metal compounds with some of the impurities like soil, sand, rocky material, etc. These impurities are called gangue.

5. Write scientific reasons.

a. Lemon or tamarind is used for cleaning copper vessels turned greenish.

(1) Copper undergoes oxidation in air to form black copper oxide. Copper oxide reacts slowly with carbon dioxide in air and gains a green coat. This green substance is copper carbonate.

(2) Lemon and tamarind contain acid. The acid dissolves the green coating of basic copper carbonate present on the surface of a tarnished copper utensile and makes it shiny again.

b. Generally the ionic compounds have high melting points.

(1) The ionic compounds exist in solid state and are hard due to strong electrostatic force of attraction between oppositely charged ions.

(2) The inter molecular force of attraction is high in ionic compounds and large energy is required to overcome it. Therefore, ionic compounds have high melting points.

c. Sodium is always kept in kerosene.

(1) Sodium reacts so vigorously with atmospheric oxygen that it catches fire if kept in the open.

(2) It does not react with kerosene and sinks in it. Hence, to protect sodium and to prevent accidental fires it is always kept in kerosene.

d. Pine oil is used in froth floatation.

(1) In the concentration of an froth floatation process, the ore is mixed with water and pine oil. When air is bubbled through the mixture a froth is formed.

(2) The mineral particles in the ore are preferentially wetted by the oil and float on the top in the froth.

(3) The gangue particles are wetted by water and settle down. Thus the mineral can be separated from the gangue and the ore is concentrated.

e. Anodes need to be replaced from time to time during the electrolysis of alumina.

(1) During electrolysis of alumina, the oxygen liberated at the carbon anode reacts with graphite rods (carbon anode) and forms carbon dioxide.

(2) As the anodes gets oxidised during electrolysis of alumina, they are continuously eroded. Hence, it is necessary to replace anodes from time to time.

6. When a copper coin is dipped in silver nitrate solution, a glitter appears on the coin after some time. Why does this happen ? Write the chemical equation.

When a copper coin is dipped in a silver nitrate solution, more reactive copper displaces silver from silver nitrate solution. The silver so liberated deposits on the copper coin. As a result, a shiny coat of silver is formed on the coin.

$$\underset{\text{Copper}}{Cu_{(s)}} + \underset{\text{Silver nitrate}}{2AgNO_{3(aq)}} \longrightarrow \underset{\text{Copper nitrate}}{Cu(NO_3)_{2(aq)}} + \underset{\text{Silver}}{2Ag}$$

7. The electronic configuration of metal 'A' is 2,8,1 and that of metal 'B' is 2,8,2. Which of the two metals is more reactive ? Write their reaction with dilute hydrochloric acid.

If the number of electrons in the outermost orbit is less, then the metal is more reactive. Metal A contains one electron in the outermost shell, while metal B contains two electrons. Hence, metal A is more reactive than metal B.

Metal A is sodium and metal B is calcium.

Reactions of Ca with dil. HCl is,

$$\underset{\text{Calcium}}{Ca} + \underset{\text{dil. HCl}}{2HCl} \longrightarrow \underset{\text{Calcium chloride}}{CaCl_2} + \underset{\text{Hydrogen}}{H_2}$$

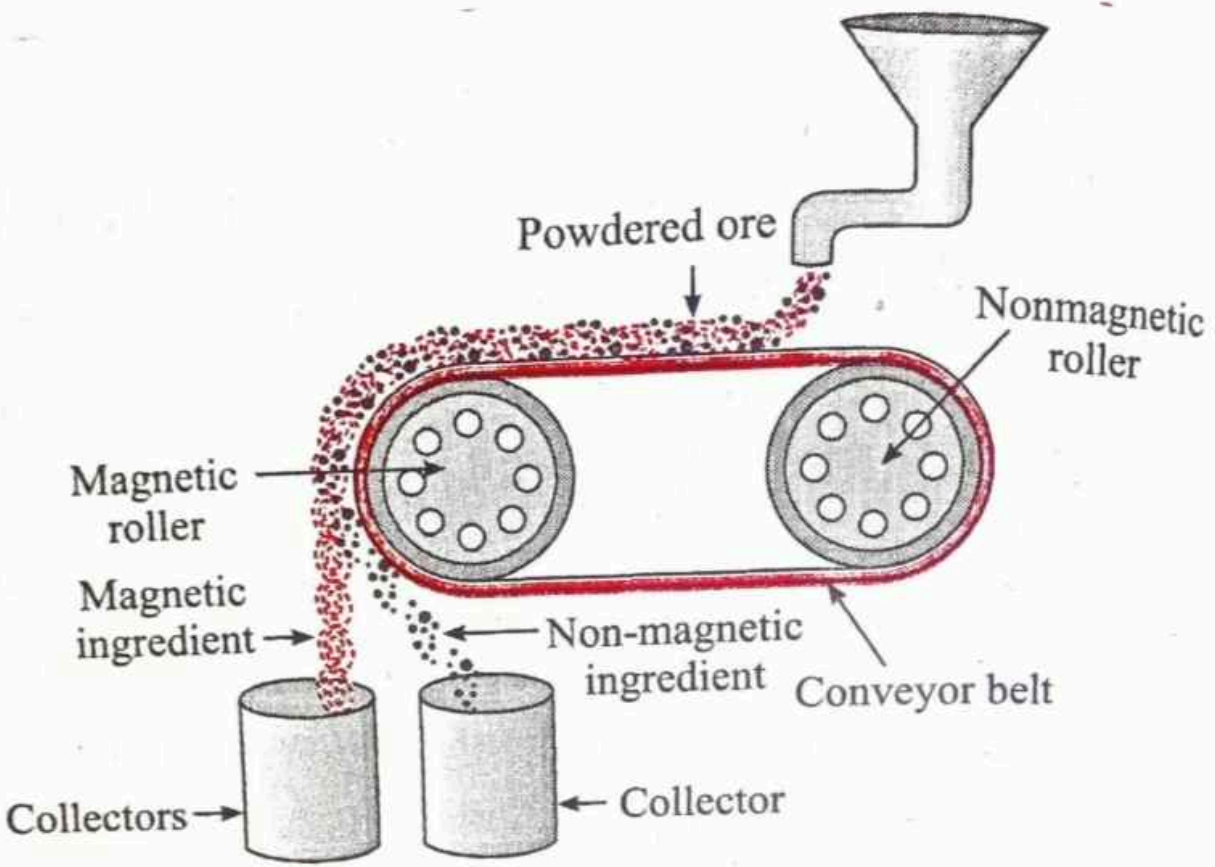
Reactions of Na with dil. HCl is,

$$2Na + 2HCl \longrightarrow 2NaCl_{(aq)} + H_{2(g)}$$

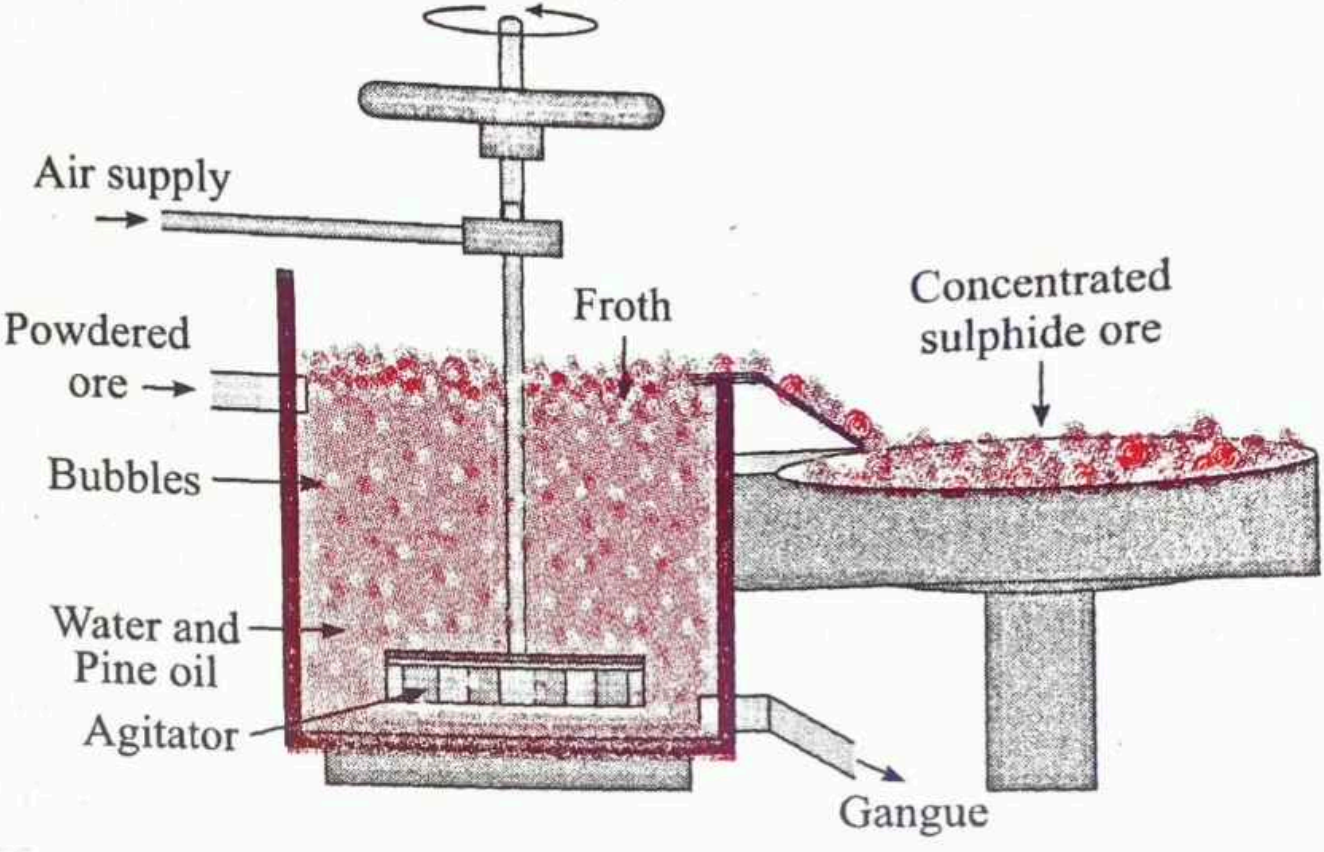
Sodium dil. HCl Sodium chloride Hydrogen

8. Draw a neat labelled diagram.

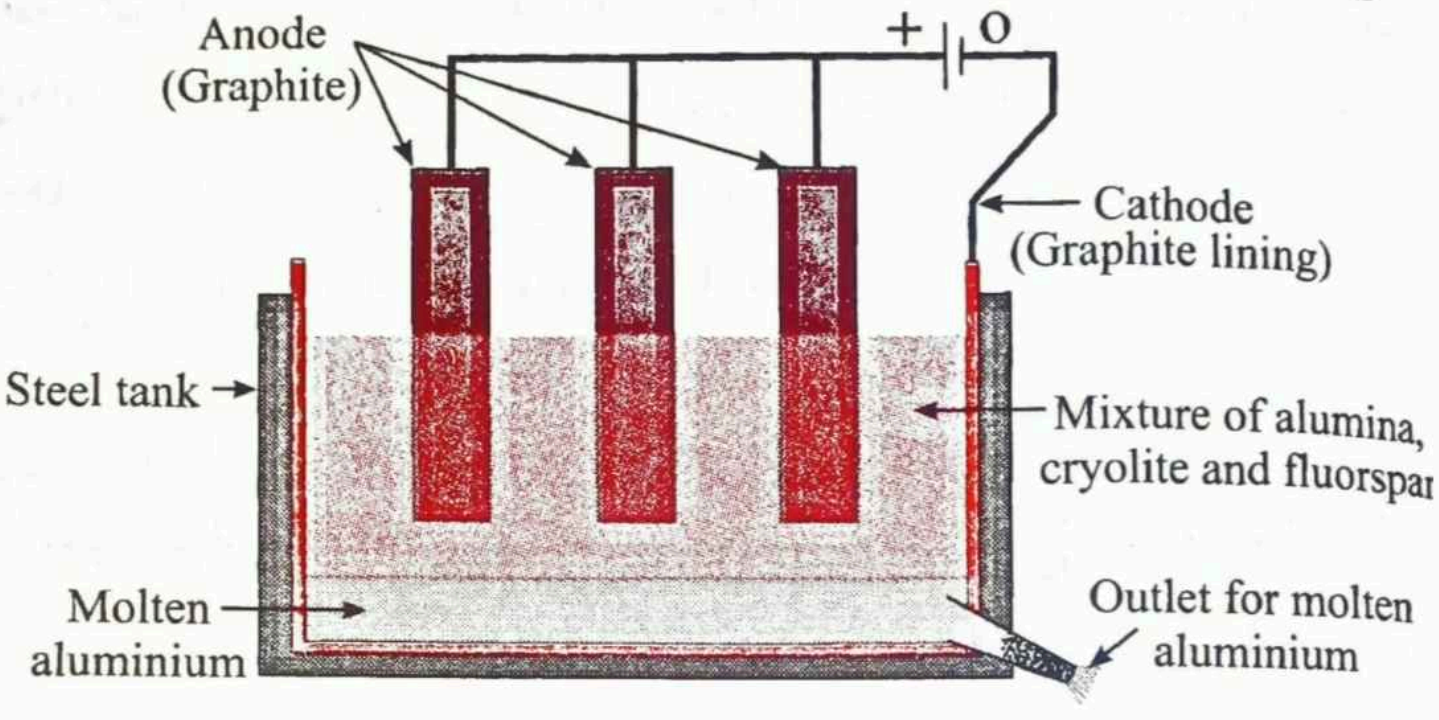
a. Magnetic separation method.



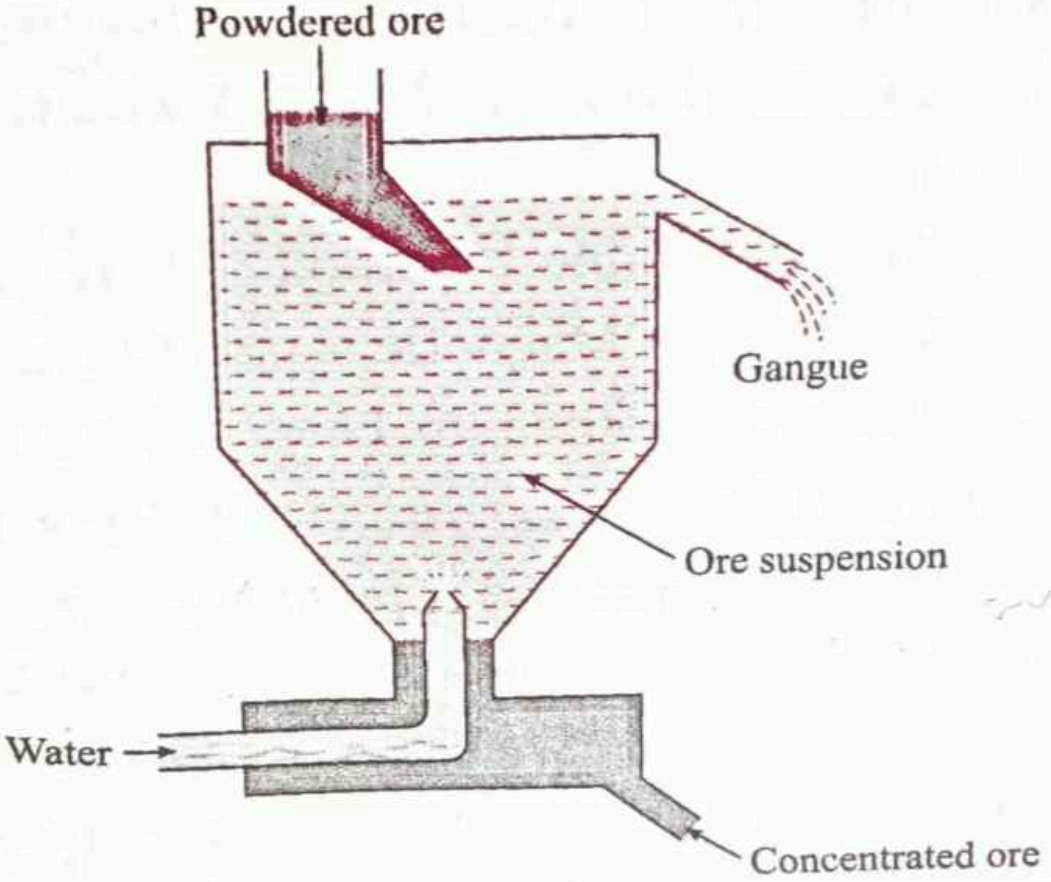
b. Froth floatation method.



c. Electrolytic reduction of alumina.



d. Hydraulic separation method.



9. Write chemical equation for the following events.

a. Aluminium came in contact with air.

When aluminium is exposed to air, it develops a thin oxide layer of aluminium.

$$4Al + 3O_2 \xrightarrow{\text{heat}} 2Al_2O_3$$

Aluminium Oxygen Aluminium oxide

b. Iron filings are dropped in aqueous solution of copper sulphate.

When iron filings are dropped in copper sulphate solution, more reactive iron displaces copper from copper sulphate solution. The iron filings get coated with reddish brown copper metal and the blue colour of copper sulphate fades gradually and ferrous sulphate is formed.

$$Fe_{(s)} + CuSO_{4(aq)} \longrightarrow FeSO_{4(aq)} + Cu_{(s)}$$

Iron — Blue copper sulphate — Colourless ferrous sulphate — Copper

c. A reaction was brought about between ferric oxide and aluminium.

When ferric oxide is heated with aluminium, it gives aluminium oxide and iron. This reaction is highly exothermic and it is known as thermit reaction.

$$Fe_2O_3 + 2Al \longrightarrow 2Fe + Al_2O_3 + Heat$$

ferric oxide Aluminium Iron Aluminium oxide (Alumina)

d. Electrolysis of alumina is done.

During electrolysis of alumina, aluminium is deposited at the cathode. Molten aluminium being heavier than the electrolyte, is collected at the bottom of the tank. Oxygen gas is liberated at the anode.

Anode reaction : $2O^{--} \longrightarrow O_2 + 4e^-$

Cathode reaction : $Al^{3+} + 3e^- \longrightarrow Al_{(l)}$

e. Zinc oxide is dissolved in dilute hydrochloric acid.

Zinc oxide is dissolved in dilute hydrochloric acid, zinc chloride and water are formed.

$$ZnO_{(s)} + 2HCl_{(l)} \longrightarrow ZnCl_{2(aq)} + H_2O_{(l)}$$

zinc oxide (basic oxide)	dil. hydrochloric acid	zinc chloride	Water

10. Complete the following statement by selecting the correct options.

During the extraction of aluminium.....

a. Ingredients and gangue in bauxite

b. Use of leaching during the concentration of ore.

c. Chemical reaction of transformation of bauxite into alumina by Hall's process.

d. Heating the aluminium ore with concentrated caustic soda.

11. Divide the metals Cu, Zn, Ca, Mg, Fe, Na, Li into three groups, namely reactive metals, moderately reactive metals and less reactive metals.

(i) Reactive metals : Na, Li, Ca.

(ii) Moderately reactive metals : Mg, Zn, Fe.

(iii) Less reactive metals : Cu.