SHIKSHA CLASSES

Subject : Science -I **Answer Paper** **Marks : 20**

Class : X **Topic : 8. Metallurgy**

Q.1: A) Choose the correct alternative : 2

1) The earthy impurities associated with mineral used in metallurgy are called

Ans: c) Gangue

2) A process employed for the concentration of sulphide ore is

Ans: b) Roasting

B) Solve the following questions. (Any One) 1

1) Write name and molecular formula of the common ore of aluminium.

Ans: Bauxite, Molecular formula ($Al_2O_3.nH_2O$)

2) Give correlation.

Bronze : Copper and Tin : : Stainless steel :

Ans: Bronze : Copper and Tin : : Stainless steel : **Iron, Chromium and Carbon**

3) State true or false.

The melting and boiling points of ionic compounds are low.

Ans: False

Q.2: A) Give scientific reason. (Any One) 2

1) Cryolite is added to alumina in the electolysis.

Ans: i) Melting point of alumina is greater than 2000°C

ii) Cryolite has less melting point. So to reduce the temperature of the fusion mixture from 2000°C to 1000°C by saving elecrical energy.

iii) They also increase the conductivity and mobility of the fused mixture. Hence cryolite is added to alumina in the electolysis.

2) Calcium floats over water during the reaction with water.

Ans: i) Calcium reacts with water less vigorously hence the heat evolved is not sufficient for hydrogen to catch fire.

ii) During the reaction bubbles of hydrogen released forms and stick to the surface of the calcium metal so calcium floats over water during the reaction with water.

B) Solve the following question. (Any Two) 4

1) State four properties of ionic compounds.

Ans: i) The ionic compounds exists in solid state and are hard.

ii) Ionic compounds are brittle and broken into pieces by applying pressure.

iii) The melting point and boiling points of ionic compounds are high.

iv) Ionic comounds are water soluble and are insoluble in solvent like kerosene and petrol.

2) Write and explain the reaction when steam is passed over aluminium.

Ans: When steam is passed over aluminium hydrogen gas is evolved and aluminium oxide is formed.

$2Al + 3H_2O \longrightarrow Al_2O_3 + 3H_2 \uparrow$

3) Define : i) Calcination ii) Galvanising

Ans: i) Calcination : Carbonate ores are strongly heated in a limited supply of air to convert them into oxides this process is called calcination.

ii) Galvanising : The process of giving a thin coating of zinc on iron or steel to protect them from corrosion called galvanizing.

4) Why sodium is always kept in Kerosene?

Ans: i) Sodium is highly reactive metal.

ii) Sodium reacts so vigrously with atmospheric oxygen that it catches fire. If it kept open in atmosphere.

iii) Sodium do not reacts with kerosene it sink in it. Hence to protect sodium and to prevent accidential fires it is stored in kerosene.

Q.3: Solve the following questions. (Any Two) 6

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

Ans: Reactive metals - Na, Mg, Li

Moderately reactive metals $\rightarrow$ Fe, Ca

Less reactive metals $\rightarrow$ Zn, Cu

2) The electronic configuration of metal 'A' is 2, 8, 1 that of metal 'B' is 2, 8, 2 which of the two metals is more reactive? write their reaction with dilute hydrochloric acid.

Ans: The metal A with electronic configuration [2, 8, 1] is more reactive than metal B

Metal A is sodium $\left[{}_{11}Na\right]$

$\therefore\ 2Na + 2HCl_{(dil)} \longrightarrow 2NaCl + H_2O$

3) Explain any three chemical properties of metals with examples and reaction.

Ans: i) Reaction of metals with oxygen -

Metal combine with oxygen on heating in air and metal oxides are formed.

Metal + Oxygen $\rightarrow$ metallic oxide

$4Na(s) + O_2(g) \longrightarrow 2Na_2O(s)$

ii) Reaction of metals with water.

When metal react with water then the hydrogen gas is released.

$2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g) + \Delta$

iii) Reaction of metals with acids.

When the metals reacts with acid then salts of metal is formed and Hydrogen gas is released.

$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$

4) Explain Corrosion of metals and methods of preventing corrosion.

Ans: The rusting of iron on coming in contact with water and oxygen is called as corrosion.

Methods of preventing corrosion :

i) Galvanizing : In this method a thin Layer of Zinc is applied on iron or steel.

ii) Timming : A molten layer of tin is deposited on metals.

iii) Anodization : Metals like aluminuim copper are coated with a thin & strong layer of their oxides by means of electrolysis.

iv) Electroplating : In this method a less reactive metal is coated on a more reactive metal by electrolysis.

v) Alloying : The homogeneous mixture formed by mixing a metal with other metals or non metals in certain proportion is called alloy.

Q.4: Solve the following questions. (Any One) 5

1) Answer the following question with reference to diagram.

i) Which machine is used in the magnetic seperation method?

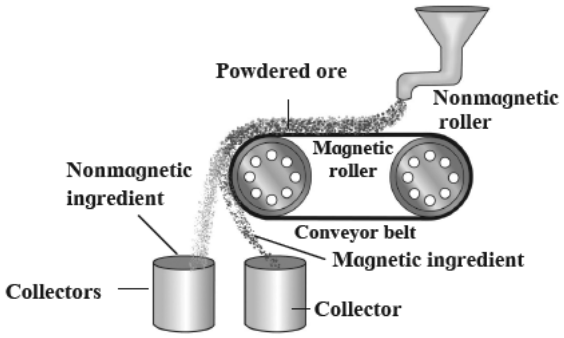
Ans: An electromagnetic machine is used for magnetic seperation method.

ii) Name the two parts of electromagnetic machine.

Ans: Main parts of electromagnetic machine are

a) Two type of iron roller

b) The conveyor belt moving continuously around them.



iii) Name the magnetic and nonmagnetic ingredients of tin ore.

Ans: The magnetic ingredients are-ferrous tungstate. The non magnetic ingredients are stannic oxide (SnO_2).

iv) From which conveyor belt is made up of ?

Ans: The conveyor belt is made up of leather or brass.

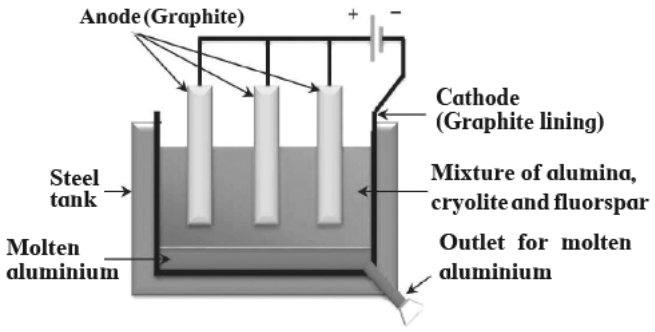
v) Name of ore of tin.

Ans: Cassiterite is the ore of tin.

2) Answer the following question with reference to diagram.

i) Which process of extraction shown in figure?

Ans: Figure shows extraction of aluminium by electrolytic reduction of alumina.



ii) Write cathode reaction.

Ans: $Al^{3+} + 3e^- \longrightarrow Al$. (Reduction)

iii) Why cryolite is mixed with molten alumina?

Ans: Cryolite is added to the molten mixture of alumina to reduce the melting point from 2000°C to 1000°C.

iv) Write the molecular formula of cryolite and flurospar.

Ans: The molecular formula of cryolite is (Na_3AlF_6), molecular formula of fluorspar CaF_2.

v) Which gas is liberate at anode?

Ans: Oxygen gas is liberated at anode.

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