

## Chapter - 3

### Metals and Non-metals

#### Multiple Choice Questions

**1. Which of the following property is generally not shown by metals?**

- (a) Electrical conduction
- (b) Sonorous in nature
- (c) Dullness
- (d) Ductility

**Soln:**

Answer is (c) Dullness

**2. The ability of metals to be drawn into thin wire is known as**

- (a) ductility
- (b) malleability
- (c) sonorosity
- (d) conductivity

**Soln:**

Answer is (a) ductility

**Explanation:**

- Ductility is property of metals to be drawn into thin wire.
- Malleability is property of metals to be drawn into thin wire
- Sonorosity is the ability of metal to be sonorous in nature
- Conductivity is the ability to conduct electricity

**3. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?**

- (i) Good thermal conductivity
- (ii) Good electrical conductivity
- (iii) Ductility
- (iv) High melting point

- (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (ii) and (iii)
- (d) (i) and (iv)

**Soln:**

Answer is (d) (i) and (iv)

**Explanation:**

Ductility and electric conductivity has no relation to cooking hence thermal conductivity and high melting point are the right answers.

**4. Which one of the following metals do not react with cold as well as hot water?**

- (a) Na
- (b) Ca
- (c) Mg
- (d) Fe

**Soln:**

Answer is (d) Fe

**Explanation:**

Sodium and Calcium reacts vigorously with water and Magnesium reacts with hot water to form Magnesium Oxide. Iron does not react with cold and hot water but it reacts with steam.

**5. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?**

- (a) FeO
- (b) Fe<sub>2</sub>O<sub>3</sub>
- (c) Fe<sub>3</sub>O<sub>4</sub>
- (d) Fe<sub>2</sub>O<sub>3</sub> and Fe<sub>3</sub>O<sub>4</sub>

**Soln:**

Answer is (c) Fe<sub>3</sub>O<sub>4</sub>

**Explanation:**



**6. What happens when calcium is treated with water?**

- (i) It does not react with water
  - (ii) It reacts violently with water
  - (iii) It reacts less violently with water
  - (iv) Bubbles of hydrogen gas formed stick to the surface of calcium
- 
- (a) (i) and (iv)
  - (b) (ii) and (iii)
  - (c) (i) and (ii)
  - (d) (iii) and (iv)

**Soln:**

Answer is (d) (iii) and (iv)

**Explanation:**

Calcium reacts vigorously with water and forms hydrogen which will make calcium to float.

**7. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?**

- (a)  $\text{H}_2\text{SO}_4$
- (b)  $\text{HCl}$
- (c)  $\text{HNO}_3$
- (d) All of these

**Soln:**

Answer is (c)  $\text{HNO}_3$

**Explanation:**

Nitric acid is a powerful oxidizing agent. It reacts with metal to form water.

**8. The composition of aqua-regia is**

- (a) Dil. $\text{HCl}$  : Conc.  $\text{HNO}_3$  3 : 1
- (b) Conc. $\text{HCl}$  : Dil.  $\text{HNO}_3$  3 : 1
- (c) Conc. $\text{HCl}$  : Conc. $\text{HNO}_3$  3 : 1
- (d) Dil. $\text{HCl}$  : Dil. $\text{HNO}_3$  3 : 1

**Soln:**

Answer is (c) Conc. $\text{HCl}$  : Conc. $\text{HNO}_3$  3 : 1

**9. Which of the following are not ionic compounds?**

- (i)  $\text{KCl}$
  - (ii)  $\text{HCl}$
  - (iii)  $\text{CCl}_4$
  - (iv)  $\text{NaCl}$
- 
- (a) (i) and (ii)
  - (b) (ii) and (iii)
  - (c) (iii) and (iv)
  - (d) (i) and (iii)

**Soln:**

Answer is (b) (ii) and (iii)

**Explanation:**

HCl and CCl<sub>4</sub> are covalent compound hence they cannot be ionic.

**10. Which one of the following properties is not generally exhibited by ionic compounds?**

- (a) Solubility in water
- (b) Electrical conductivity in solid state
- (c) High melting and boiling points
- (d) Electrical conductivity in molten state

**Soln:**

Answer is (b) Electrical conductivity in solid state

**Explanation:**

In ionic compound free ions are not available in solid state hence solid ionic compounds cannot conduct electricity.

**11. Which of the following metals exist in their native state in nature?**

- (i) Cu
- (ii) Au
- (iii) Zn
- (iv) Ag

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (ii) and (iv)
- (d) (iii) and (iv)

**Soln:**

Answer is (c) (ii) and (iv)

**Explanation:**

Gold and silver are non-reactive metals because of they are non-reactive they exist in native state in nature.

**12. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?**

- (i) Au
- (ii) Cu
- (iii) Na
- (iv) K

- (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (ii) and (iii)
- (d) (iii) and (iv)

**Soln:**

Answer is (d) (iii) and (iv)

**Explanation:**

Sodium and potassium are at the top in reactivity series hence they can be refined by electrolytic refining.

**13. Silver articles become black on prolonged exposure to air. This is due to the formation of**

- (a)  $\text{Ag}_3\text{N}$
- (b)  $\text{Ag}_2\text{O}$
- (c)  $\text{Ag}_2\text{S}$
- (d)  $\text{Ag}_2\text{S}$  and  $\text{Ag}_3\text{N}$

**Soln:**

Answer is (c)  $\text{Ag}_2\text{S}$

**Explanation:**

Silver metal reacts with sulphur present in the atmosphere to form  $\text{Ag}_2\text{S}$ .  $\text{Ag}_2\text{S}$  is responsible for black coloration of silver articles.

**14. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of**

- (a) Gallium
- (b) Aluminium
- (c) Zinc
- (d) Silver

**Soln:**

Answer is (c) Zinc

**Explanation:**

Galvanization is a process of applying a layer of Zinc on iron by using electrolysis.

**15. Stainless steel is very useful material for our life. In stainless steel, iron is mixed with**

- (a) Ni and Cr
- (b) Cu and Cr
- (c) Ni and Cu
- (d) Cu and Au

**Soln:**

Answer is (a) Ni and Cr

**Explanation :**

Stainless steel is an alloy of Iron, Nickel and chromium. This alloy makes the metal strong, durable and corrosion resistant.

**16. If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. It is due to the formation of**

- (a)  $\text{CuSO}_4$
- (b)  $\text{CuCO}_3$
- (c)  $\text{Cu}(\text{NO}_3)_2$
- (d)  $\text{CuO}$

**Soln:**

Answer is (d)  $\text{CuO}$

**Explanation:**

On exposure to air copper reacts to atmospheric oxygen to form copper oxide layer which is green in color.

**17. Generally, metals are solid in nature. Which one of the following metals is found in liquid state at room temperature?**

- (a) Na
- (b) Fe
- (c) Cr
- (d) Hg

**Soln:**

Answer is (d) Hg

**18. Which of the following metals are obtained by electrolysis of their chlorides in molten state ?**

- (i) Na
  - (ii) Ca
  - (iii) Fe
  - (iv) Cu
- 
- (a) (i) and (iv)
  - (b) (iii) and (iv)
  - (c) (i) and (iii)
  - (d) (i) and (ii)

**Soln:**

Answer is (d) (i) and (ii)

**Explanation:**

Sodium and Calcium are in the top in reactivity series

**19. Generally, non-metals are not lustrous. Which of the following nonmetal is lustrous?**

- (a) Sulphur
- (b) Oxygen
- (c) Nitrogen
- (d) Iodine

**Soln:**

Answer is (d) Iodine

**20. Which one of the following four metals would be displaced from the solution of its salts by other three metals?**

- (a) Mg
- (b) Ag
- (c) Zn
- (d) Cu

**Soln:**

Answer is (b) Ag

**Explanation:**

Because silver is a non-reactive metal it can be displaced easily.

**21. 2 mL each of concentrated HCl, HNO<sub>3</sub> and a mixture of concentrated HCl and concentrated HNO<sub>3</sub> in the ratio of 3 : 1 were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C respectively. The metal could be**

- (a) Al
- (b) Au
- (c) Cu
- (d) Pt

**Soln:**

Answer is (b) Au

**Explanation:**

Answer is gold because solution C is mixture of Concentrated HCL and Concentrated HNO<sub>3</sub> which is called aqua rezia. Aqua Rezia dissolves gold.

- 22. An alloy is**  
(a) an element  
(b) a compound  
(c) a homogeneous mixture  
(d) a heterogeneous mixture

**Soln:**

Answer is (c) a homogeneous mixture

**Explanation:**

An Alloy is a homogeneous mixture because its composition is uniform.

- 23. An electrolytic cell consists of**  
(i) positively charged cathode  
(ii) negatively charged anode  
(iii) positively charged anode  
(iv) negatively charged cathode

- (a) (i) and (ii)  
(b) (iii) and (iv)  
(c) (i) and (iii)  
(d) (ii) and (iv)

**Soln:**

Answer is (b) (iii) and (iv)

- 24. During electrolytic refining of zinc, it gets**  
(a) deposited on cathode  
(b) deposited on anode  
(c) deposited on cathode as well as anode  
(d) remains in the solution

**Soln:**

Answer is (a) deposited on cathode

**Explanation:**

Zinc is positively charged hence it moves towards negatively charged cathode.

- 25. An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following**

- (a) Mg  
(b) Na  
(c) P  
(d) Ca



**Soln:**

Answer is (b) Na

**Explanation:**

Sodium is soft which can be cut with a knife. Sodium reacts with water and air vigorously hence it is kept in kerosene.

**26. Alloys are homogeneous mixtures of a metal with a metal or nonmetal. Which among the following alloys contain non-metal as one of its constituents?**

- (a) Brass
- (b) Bronze
- (c) Amalgam
- (d) Steel

**Soln:**

Answer is (d) Steel

**Explanation:**

Steel is an alloy made up of carbon and iron where carbon is a non-metal.

**27. Which among the following statements is incorrect for magnesium metal?**

- (a) It burns in oxygen with a dazzling white flame
- (b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas
- (c) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas
- (d) It reacts with steam to form magnesium hydroxide and evolves hydrogen gas

**Soln:**

Answer is (b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas

**Explanation:**

Magnesium reacts with cold water to form magnesium hydroxide and evolves hydrogen gas is a wrong statement because Magnesium Hydroxide is formed not Magnesium oxide.

**28. Which among the following alloys contain mercury as one of its constituents?**

- (a) Stainless steel
- (b) Alnico
- (c) Solder
- (d) Zinc amalgam

**Soln:**

Answer is (d) Zinc amalgam

**Explanation:**

Zinc amalgam is an alloy of Mercury and Zinc

**29. Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?**

- (a) Has high melting point
- (b) Has low melting point
- (c) Conducts electricity in molten state
- (d) Occurs as solid

**Soln:**

Answer is (b) Has low melting point

**Explanation:**

Here Z is an ionic compound and Ionic compounds have melting point hence option b) is a wrong statement.

**30. The electronic configurations of three elements X, Y and Z are X — 2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which of the following is correct?**

- (a) X is a metal
- (b) Y is a metal
- (c) Z is a non-metal
- (d) Y is a non-metal and Z is a metal

**Soln:**

Answer is (d) Y is a non-metal and Z is a metal

**Explanation:**

Element Y has 3 electron in its outer which is electronegative in nature. Z has 2 electrons in its outermost shell hence it is electropositive. Hence it is a metal.

**31. Although metals form basic oxides, which of the following metals form an amphoteric oxide?**

- (a) Na
- (b) Ca
- (c) Al
- (d) Cu

**Soln:**

Answer is (c) Al

**Explanation:**

Oxides of Aluminum are both acidic and basic in nature. Hence aluminum oxides are amphoteric in nature.

**32. Generally, non-metals are not conductors of electricity. Which of the following is a good conductor of electricity?**

- (a) Diamond
- (b) Graphite
- (c) Sulphur
- (d) Fullerene

**Soln:**

Answer is (b) Graphite

**33. Electrical wires have a coating of an insulating material. The material, generally used is**

- (a) Sulphur
- (b) Graphite
- (c) PVC
- (d) All can be used

**Soln:**

Answer is (c) PVC

**Explanation:**

Sulphur is brittle in nature, hence it can be used and Graphite is a good conductor of electricity hence it cannot be used as insulator.

**34. Which of the following non-metals is a liquid?**

- (a) Carbon
- (b) Bromine
- (c) Phosphorus
- (d) Sulphur

**Soln:**

Answer is (b) Bromine

**35. Which of the following can undergo a chemical reaction?**

- (a)  $\text{MgSO}_4 + \text{Fe}$
- (b)  $\text{ZnSO}_4 + \text{Fe}$
- (c)  $\text{MgSO}_4 + \text{Pb}$
- (d)  $\text{CuSO}_4 + \text{Fe}$

**Soln:**

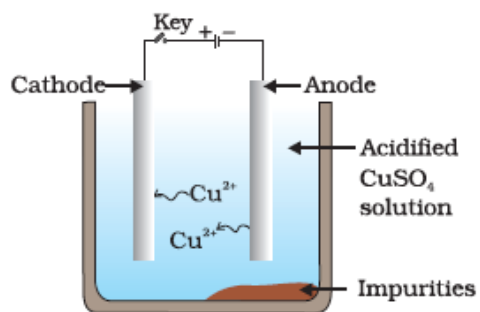
Answer is (d)  $\text{CuSO}_4 + \text{Fe}$

**Explanation:**

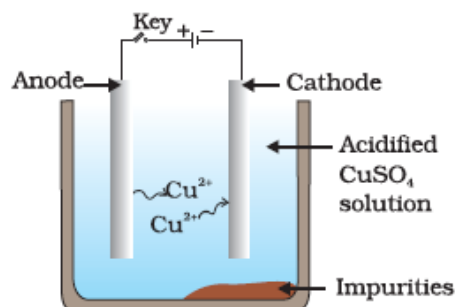
Iron is more reactive than copper hence it displaces copper in the reaction to form  $\text{FeSO}_4$ .

36. Which one of the following figures correctly describes the process of electrolytic refining?

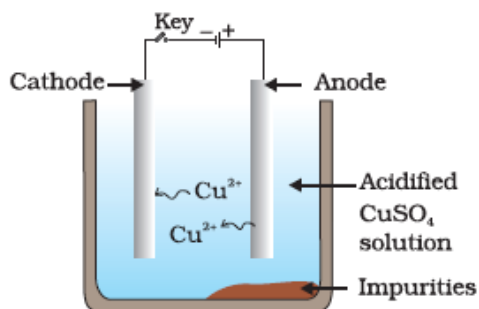
of electrolytic refining?



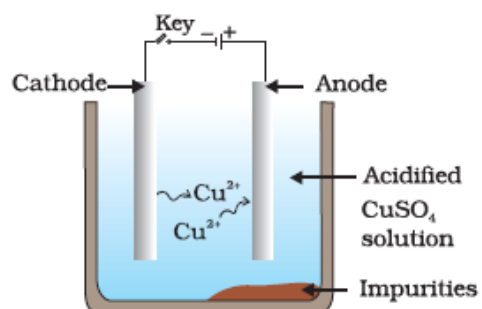
(a)



(b)



(c)



(d)

**Fig. 3.1**

**Soln:**

Answer is b)

**Explanation:**

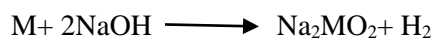
Copper ions are dispersed from positively charged anode and deposited on negatively charged cathode.

### Short Answer Questions

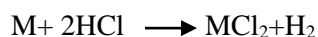
**37. Iqbal treated a lustrous, divalent element M with sodium hydroxide. He observed the formation of bubbles in reaction mixture. He made the same observations when this element was treated with hydrochloric acid. Suggest how can he identify the produced gas. Write chemical equations for both the reactions.**

**Soln:**

To identify the produced gas, lighted matchstick should be brought near the gas. If match stick burns with pop sound, it indicates the evolution of Hydrogen gas.



With HCl



**38. During extraction of metals, electrolytic refining is used to obtain pure metals. (a) Which material will be used as anode and cathode for refining of silver metal by this process? (b) Suggest a suitable electrolyte also. (c) In this electrolytic cell, where do we get pure silver after passing electric current?**

**Soln:**

- a) During extraction of metals, impure metal will be used as anode and pure metal is used as cathode for refining of silver metal by this electrolytic refining.
- b) Silver Sulphate or Silver Nitrate
- c) Pure silver is obtained on cathode

**39. Why should the metal sulphides and carbonates be converted to metal oxides in the process of extraction of metal from them?**

**Soln:**

Metal sulphides and carbonates are converted to metal oxides in the process of extraction of metal from them because metals can be obtained easier in oxide form than its sulphide or carbonate form.

**40. Generally, when metals are treated with mineral acids, hydrogen gas is liberated but when metals (except Mn and Mg), treated with HNO<sub>3</sub>, hydrogen is not liberated, why?**

**Soln:**

HNO<sub>3</sub> is a strong oxidizing agent. It oxidises the liberated Hydrogen into water while converting itself to nitrogen oxide.

**41. Compound X and aluminium are used to join railway tracks. (a) Identify the compound X (b) Name the reaction (c) Write down its reaction.**

**Soln:**

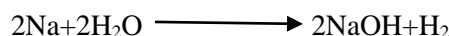
- a) Answer is Fe<sub>2</sub>O<sub>3</sub>
- b) Involved reaction is a thermite reaction which is also called as aluminothermy
- c)  $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al}(\text{s}) \rightarrow \text{Al}_2\text{O}_3(\text{s}) + 2\text{Fe}(\text{s}) + \text{Heat}$  Ferric oxide Aluminium Iron Oxide.

**42. When a metal X is treated with cold water, it gives a basic salt Y with molecular formula XOH (Molecular mass = 40) and liberates a gas Z which easily catches fire. Identify X, Y and Z and also write the reaction involved.**

**Soln:**

X is Na because molecular mass of NaOH is 40.  
Hence Y is NaOH

Z is hydrogen gas which catches fire when reacts with water.



**43. A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.**

**Soln:**

X is Carbon, Y and Z are Diamond and Graphite which are allotropes of the carbon.

**44. The following reaction takes place when aluminium powder is heated with MnO<sub>2</sub>**



**(a) Is aluminium getting reduced? (b) Is MnO<sub>2</sub> getting oxidised?**

**Soln:**

In this reaction aluminium gets oxidized as oxygen gets combined with it. Since oxygen is removed from MnO<sub>2</sub> it is getting reduced.

**45. What are the constituents of solder alloy? Which property of solder makes it suitable for welding electrical wires?**

**Soln:**

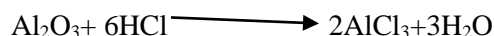
Solder alloy is made of Lead and aluminium. Its low melting point makes it suitable for welding electrical wires.

**46. A metal A, which is used in thermite process, when heated with oxygen gives an oxide B, which is amphoteric in nature. Identify A and B. Write down the reactions of oxide B with HCl and NaOH.**

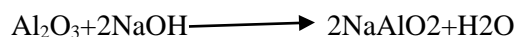
**Soln:**

Metal A is Aluminium and B is  $\text{Al}_2\text{O}_3$

**With HCl**



**With NaOH**



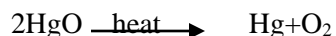
**47. A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore and give the reaction involved.**

**Soln:**

Mercury is the metal which is liquid at room temperature. Ore of Mercury is Cinnabar. When we heat cinnabar in atmospheric oxygen following reaction takes place.



Mercuric oxide is again heated to get Mercury and Oxygen



**48. Give the formulae of the stable binary compounds that would be formed by the combination of following pairs of elements.**

(a) Mg and  $\text{N}_2$

(b) Li and  $\text{O}_2$

(c) Al and  $\text{Cl}_2$

(d) K and  $\text{O}_2$

**Soln:**

- a) Magnesium Nitride ( $\text{Mg}_3\text{N}_2$ )
- b) Lithium Oxide ( $\text{Li}_2\text{O}$ )
- c) Aluminium Chloride ( $\text{AlCl}_3$ )
- d) Potassium Oxide ( $\text{K}_2\text{O}$ )

**49. What happens when**

- (a)  $\text{ZnCO}_3$  is heated in the absence of oxygen?**
- (b) a mixture of  $\text{Cu}_2\text{O}$  and  $\text{Cu}_2\text{S}$  is heated?**

**Soln:**

a) When  $\text{ZnCO}_3$  is heated in the absence of oxygen Zinc Oxide and Carbon-di-oxide are liberated.  
 $\text{ZnCO}_3 \longrightarrow \text{ZnO} + \text{CO}_2$

b) When a mixture of  $\text{Cu}_2\text{O}$  and  $\text{Cu}_2\text{S}$  is heated we get pure copper  
 $2 \text{Cu}_2\text{O} + \text{Cu}_2\text{S} \longrightarrow 6\text{Cu} + \text{SO}_2$

**50. A non-metal A is an important constituent of our food and forms two oxides B and C. Oxide B is toxic whereas C causes global warming**

- (a) Identify A, B and C**
- (b) To which Group of Periodic Table does A belong?**

**Soln:**

- a) A is Carbon. B is Carbon monoxide C is Carbon-dioxide
- b) Group 14

**51. Give two examples each of the metals that are good conductors and poor conductors of heat respectively.**

**Soln:**

Good conductors- Iron and Copper  
Bad conductors- Lead and Mercury

**52. Name one metal and one non-metal that exist in liquid state at room temperature. Also name two metals having melting point less than 310 K ( $37^\circ\text{C}$ )**

**Soln:**

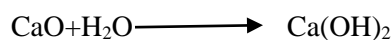
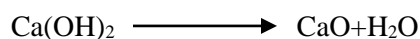
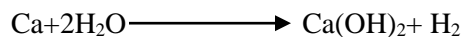
Mercury and Bromine are liquid at room temperature. Caesium and Gallium are the metals whose melting point is less than 310K( $37^\circ\text{C}$ ).



**53. An element A reacts with water to form a compound B which is used in white washing. The compound B on heating forms an oxide C which on treatment with water gives back B. Identify A, B and C and give the reactions involved.**

**Soln:**

A is calcium, B is calcium Hydroxide and C is Calcium Oxide.



**54. An alkali metal A gives a compound B (molecular mass = 40) on reacting with water. The compound B gives a soluble compound C on treatment with aluminium oxide. Identify A, B and C and give the reaction involved.**

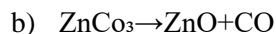
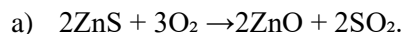
**Soln:**

A is sodium and B is Sodium Hydroxide. Because molecular mass of NaOH is 40. So C is Sodium Aluminate.



**55. Give the reaction involved during extraction of zinc from its ore by (a) roasting of zinc ore (b) calcination of zinc ore**

**Soln:**

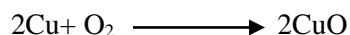


**56. A metal M does not liberate hydrogen from acids but reacts with oxygen to give a black colour product. Identify M and black coloured product and also explain the reaction of M with oxygen.**

**Soln:**

Copper is the metal which does not react with acids. With oxygen it forms Copper Oxide.

Metal M is Copper and black colored product is Copper oxide.



**57. An element forms an oxide  $A_2O_3$  which is acidic in nature. Identify A as a metal or non-metal.**

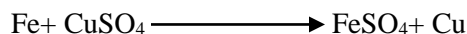
**Soln:**

A is a non-metal because oxides of non-metals are acidic in nature.

**58. A solution of  $CuSO_4$  was kept in an iron pot. After few days the iron pot was found to have a number of holes in it. Explain the reason in terms of reactivity. Write the equation of the reaction involved.**

**Soln:**

Iron is more reactive than copper hence Iron displaces Copper to produce  $FeSO_4$ . In this process a portion of Iron Gets dissolved which results in Holes in the pot.



### Long Answer Questions

**59. A non-metal A which is the largest constituent of air, when heated with  $H_2$  in 1:3 ratio in the presence of catalyst (Fe) gives a gas B. On heating with  $O_2$  it gives an oxide C. If this oxide is passed into water in the presence of air it gives an acid D which acts as a strong oxidising agent.**

**(a) Identify A, B, C and D**

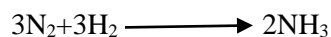
**(b) To which group of periodic table does this non-metal belong?**

**Soln:**

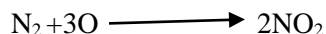
a)

Non-metal a is nitrogen because it is the largest constituent of air which constitute around 78% of the gases.. B is Ammonia, C is Nitrogen-di-oxide and D is Nitric acid.

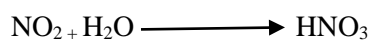
When heated with  $H_2$  in 1:3 ratio in the presence of catalyst (Fe) following reaction takes place.



On heating Nitrogen with  $O_2$  it gives nitrogen-di-oxide



When nitrogen-di-oxide is passed into water in the presence of air it gives an Nitric acid



b)

Nitrogen belong to group 15

**60. Give the steps involved in the extraction of metals of low and medium reactivity from their respective sulphide ores.**

**Soln:**

During the extraction of metals of low and medium reactivity from their respective sulphide ores.

They are first heated in presence of atmospheric oxygen. This step will give out oxides of metal. This step is used as it is more efficient method to extract methods.

Ex: Cinnabar is heated in air to get mercuric sulphide oxidize to produce mercuric oxide.



Mercuric oxide is further heat to get Mercury

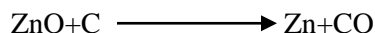


Zinc is a metal of medium reactivity and its ore is Zinc Blende

Zinc Blend is roasted to get Zinc oxide



Zinc oxide when heated with  $\text{CO}$  Zinc is obtained



**61. Explain the following**

**(a) Reactivity of Al decreases if it is dipped in  $\text{HNO}_3$**

**(b) Carbon cannot reduce the oxides of Na or Mg**

**(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state**

**(d) Iron articles are galvanised.**

**(e) Metals like Na, K, Ca and Mg are never found in their free state in nature.**

**Soln:**

a) Reactivity of Aluminium decreases if it is dipped in  $\text{HNO}_3$  because  $\text{HNO}_3$  is a strong oxidizing agent. Here a layer of aluminium oxide gets deposited because of which reactivity of aluminium gets reduced.

(b) Carbon cannot reduce the oxides of Na or Mg because these are highly reactive metals. Na and Mg have higher affinity to oxygen than carbon. Hence carbon fails to reduce the oxides of Na and Mg.

(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state because NaCl is an ionic compound. Ionic compounds cannot conduct electricity in solid state but they can conduct electricity in aqueous solution and in molten state.

d) Iron readily reacts with atmospheric oxygen and forms rust. To avoid rusting of iron it is galvanized.

e) Metals like Na, K, Ca and Mg are highly reactive metals. They can form compounds with almost every element. Because of this they are not found in their native form in nature.

**62. (i) Given below are the steps for extraction of copper from its ore. Write the reaction involved.**

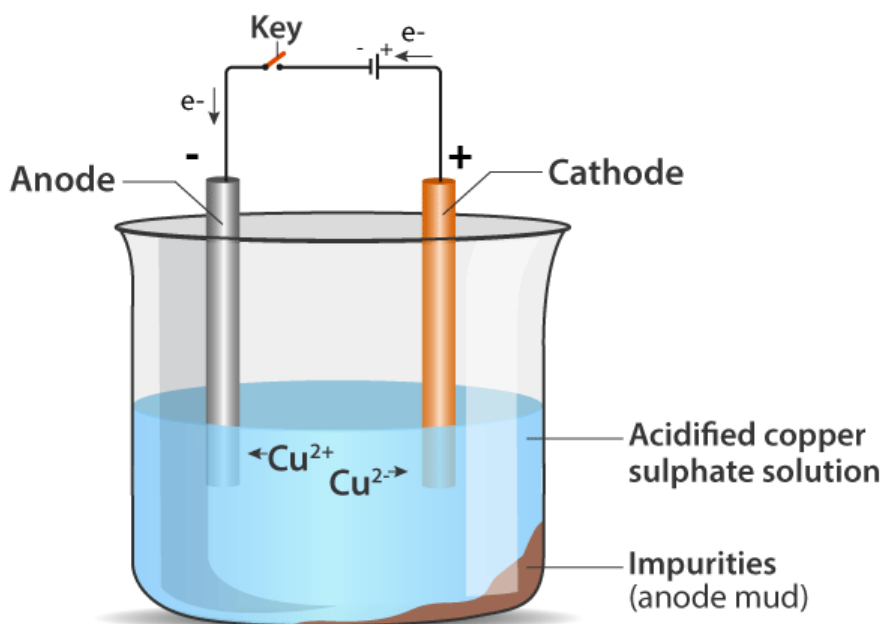
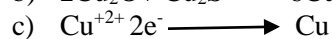
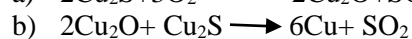
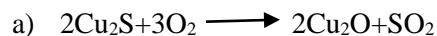
**(a) Roasting of copper (I) sulphide**

**(b) Reduction of copper (I) oxide with copper (I) sulphide.**

**(c) Electrolytic refining**

**(ii) Draw a neat and well labelled diagram for electrolytic refining of copper**

**Soln:**

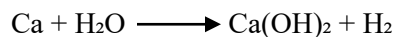


**63. Of the three metals X, Y and Z. X reacts with cold water, Y with hot water and Z with steam only. Identify X, Y and Z and also arrange them in order of increasing reactivity.**

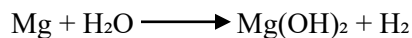
**Soln:**

X reacts with cold water.

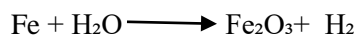
Hence, the element should be Sodium



Y reacts with hotwater, Hence, it is "Magnesium"



Z reacts with steam only. Hence, it is Iron



Arranging in ascending order (increasing order of reactivity)



**64. An element A burns with golden flame in air. It reacts with another element B, atomic number 17 to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also write down the equations for the reactions involved.**

**Soln:**

Element A is 17 Sodium because it will burn with golden flame in air.

Element B is Chlorine for its atomic number is 17.

Product C is Sodium Chloride



Product D is Sodium hydroxide



**65. Two ores A and B were taken. On heating ore A gives CO<sub>2</sub> whereas, ore B gives SO<sub>2</sub> . What steps will you take to convert them into metals?**

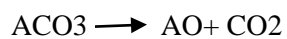
**Soln:**

Ore A gives CO<sub>2</sub> on heating hence it is a carbonate ore

Steps involved in Extraction of ore A

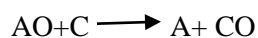
a) Calcination

Ore is heated in limited supply of air to obtain metal oxide



b) Reduction

Metal oxide is reduced with coke to obtain metal.



Ore B is a sulphide ore

Steps involved in extraction of element B are

a) Roasting

Ore is heated in presence of air to obtain metal oxide



b) Reduction

Metal oxide is reduced to metal by carbon

