ಎಸ್ಎಸ್ಎಲ್ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

SCIENCE

METALS AND NON-METALS

Answer the following questions

17. What happens when:

i] Lead is heated to 400-500^0 C in air.

ii] Steam is passed over heated iron.

iii] Copper oxide is heated with magnesium.

iv] Aluminium wire is dipped in heating water.

Ans:- **(……Contd)**

iii] On heating with magnesium, copper oxide is reduced to the copper metal.

$$CuO + Mg \rightarrow MgO + Cu$$

iv] In boiling water, aluminum forms aluminium hydroxide and H_2 gas is liberated.

$$Al + 3H_2O \rightarrow Al(OH)_3 + 3H_2$$

18. Carbon at red heat removes oxygen from the oxides of the metals A, B and C but not from the oxide of metal D. Metal C removes oxygen from the oxide of A but not from the oxide of B. Arrange the metals A, B, C and D in a decreasing order of reactivity. Also give reasons in support of the answer.

Ans:- i] Since carbon removes oxygen from the oxides of metals A, B and C, therefore, carbon is more reactive than metals A, B, C.

ii] D is more reactive than carbon as it (carbon) cannot remove oxygen from the oxide of D,
i.e., D > carbon > A, B, or C.

iii] Metal C is more reactive than metal A because it can remove oxygen from oxide of A, i.e., C > A.

v] Since metal C cannot remove oxygen from the oxide of metal B, therefore, metal B is more reactive than C i.e., B > C.

Thus the decreasing order of reactivity is D > B > C> A.

19. Give reasons for the following:

i] Metals conduct electricity.

ii] For making gold ornaments, 22 card gold is preferred to 24 carat gold

Ans:- i] Metals conduct electricity because they have electrons which are free to move. They offer little resistance to the flow of current. Silver and copper are the best conductors of electricity.

ii] Pure gold is 24 carat and is very soft. Therefore, it is not suitable for making jewellery. It is alloyed with Cu or Ag to make it hard. Generally, 22 carat gold is used for making ornaments, which contains twenty-two parts pure gold and two parts of either Cu or Ag.

20. Explain the terms:

a] Anodising, b] Aqua regia

Ans:- a] Anodising is a process of forming a thick oxide layer of aluminium. During anodizing, a clean aluminum article is made the anode and is electrolyzed with dilute sulphuric acid. The oxygen liberated at the anode reacts with aluminium to produce a thick protective oxide layer on its surface.

Also the oxide layer can be dyed easily to give an attractive finish to the aluminium articles.

b] Aqua regia is a freshly prepared mixture of concentrated hydrochloric acid and concentrated nitric acid in the ratio 3 : 1. It is also called royal water. It is highly corrosive and fuming liquid. It can dissolve noble metals like gold platinum.

21. What can we infer from the activity series of metals?

Ans:- Informations available from the activity series are –

i] A metal will displace any of the metals below it in the activity series from their solution, e.g., magnesium will displace zinc from its solution.

ii] Metals above hydrogen in the activity series displace hydrogen from dilute acids, e.g., calcium, zinc.

iii] Metals at the top of activity series are more electropositive and do not occur free in nature, e.g., Na, Mg.

iv] Metals at the bottom of activity series are less electropositive and normally occur free in nature and do not corrode due to moisture.

22. Arrange Ca, Zn, Al, Ba, Au, Fe, Ag and Cu in their decreasing order of reactivity. What is the common property of metals occurring at the bottom of the activity series of metals?

Ans:- Ba > Ca > Al > Zn > Fe > Cu > Ag > Au.

Metals at the bottom of activity series are less electropositive and normally occur free in nature and do not corrode due to moisture.

23. A metal 'X' when dipped in aqueous solution of aluminium sulphate, no reaction is observed whereas when it is dipped in the aqueous solution of ferrous sulphate the pale green solution turns colourless. Identify metal 'X' and justify the answer giving chemical equations for the reaction.

Ans:- The given statement shows X is less reactive than aluminium but more reactive than iron. Thus X is zinc.

$$ZN + Al_2(SO_4)_3 \rightarrow \text{no reaction}$$

$$Zn + FeSO_4 \rightarrow ZnSO_4 + Fe$$

24. A certain metal 'X' lies between potassium and magnesium in the activity series.

Answer the following question:

a] What will happen when 'X' is added to cold water?

b] What reaction will take place between X and dilute hydrochloride acid?

Ans:- Since both potassium and magnesium lie above hydrogen in the activity series, these and also X are more reactive than hydrogen, therefore,

a] X will react with water forming its hydroxide displacing hydrogen.

b] X will react with hydrochloride acid liberating hydrogen and forming the chloride of X in solution.

25. An aluminium can is used to store ferrous sulphate solution. It is observed that in a few days holes appeared in the can. Explain the cause for this observation and write chemical equation to support the answer.

Ans:- Aluminium is more reactive than iron. Therefore aluminium slowly reacts with solution of ferrous sulphate and holes are developed in the aluminum can.

$$2Al(s) + 3FeSO_4(aq) \rightarrow Al_2(SO_4)_3 + 3Fe(s)$$

26. Show that CO_2 gas as well as SO_2 are acidic in nature.

Ans:- Introduce a blue litmus paper through a water solution in which either CO_2 gas or SO_2 gas is dissolved. It will be observed that the blue litmus paper turns red. This shows the acidic characteristics of oxides of carbon and sulphur.

27. Though non-metals are small in number, their presence is vital for the existence of life. Comment.

Ans:- Non-metals form the major constitutions of air, ocean and earth. Main constituents of air are oxygen and nitrogen. Chlorine occurs in the ocean as chlorides. Earth's crust contains non-metals like oxygen, ***(Contd)***