

Metals and Nonmetals

1) State the physical properties of metals .

Ans) a) metals are malleable

b) metals are ductile

c) metals are sonorous , lustrous

d) metals are good conductors of heat and electricity

e) high melting and boiling points except gallium and caesium)

2) State the any two chemical properties of metals .

Ans) a) metals are electropositive

b) metals release hydrogen gas on reacting with acids (reactive metals)

3) Name any three strategic metals

Ans) a) titanium b) chromium c) zirconium(they are called strategic because they are essential for countries economy and defence)

4) Metals are generally hard , name any two soft metals .

Ans) sodium and potassium

5) Name the most malleable metals

Ans) gold and silver

6) why are gold and silver used to make jewellery?

Ans) they are malleable and ductile and also have luster , they do not react easily with the air and moisture.

7)Name the metal which is best conductor of heat

Ans) silver

8) Why are cooking utensils mostly made up of aluminium?

Ans) Cooking vessels are made up of aluminium because it is a good conductor of heat , also aluminium forms a coating of oxide on its surface which prevents its reaction with the food.

9) Name the metals which are poor conductors of heat

Ans) lead and mercury

10) Name the metals which are best conductors of electricity

Ans) copper and aluminium.

11) Why are school bells made up of metals ?

Ans) because metals are sonorous

12) State the properties of nonmetals

Ans) Non metals are

Brittle , not malleable and not ductile, bad conductors of heat and electricity (except graphite)

Low tensile strength, low melting and boiling points (except diamond and graphite)and less dense and non lustrous .

13) Name the metal which is in liquid state .

Ans) mercury

14) Name the nonmetal which is lustrous

Ans) Iodine

15) Name the nonmetal which is in liquid state .

Ans) bromine .

16) Name two metals having low melting and boiling points .

Ans) Gallium and caesium

17) Name metals which are soft (can be cut with a knife) and have low density.

Ans) sodium and potassium.

18) Metals are electropositive. explain

Ans) Metals have 1, 2 or 3 electrons in their outermost orbit , they lose electrons to achieve stability thus forming positive ions , hence they are called electropositive

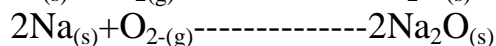
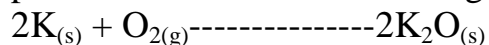
19) Non metals are electronegative . explain

Ans) Non metals have 5, 6 or 7 electrons in their outermost orbit , they gain electrons to achieve stability ,thus forming negative ions

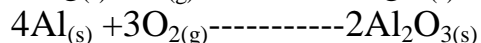
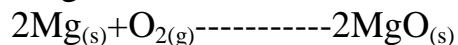
20) How do metals react with oxygen ?

Ans) Almost all metals react with oxygen to form metal oxide But all metals do not react with oxygen with same speed and vigour

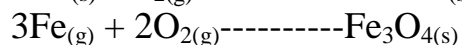
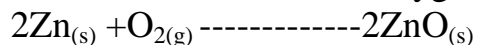
a) potassium and sodium react vigorously ,they catch fire when exposed to open air .



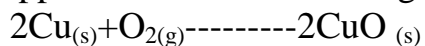
b) Magnesium and Aluminium react with oxygen on heating forming their respective oxides.



c) Zinc and iron react with oxygen on strong heating

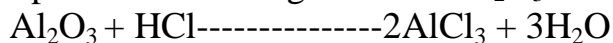


d) Copper forms a black coating on its surface on prolonged heating in air .



21) What are amphoteric oxides ?

Ans) Metal oxides are generally basic in nature ..but some metal oxides show both acidic as well as basic behaviour. They react with acids and bases to form salt and water ,such metal oxides are called amphoteric oxides eg ZnO and Al₂O₃



22) What are alkalies ?

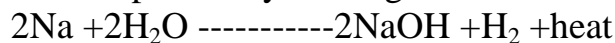
Some metal oxides dissolve in water and form alkalies

Eg- sodium oxide dissolves in water to form sodium hydroxide.

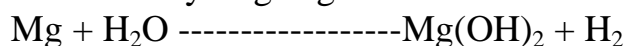
23) How do metals react with water ?

Ans) Metals react with water forming metal oxides and hydrogen gas .

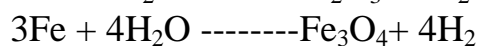
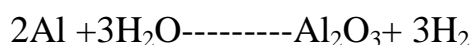
a) metals like Na and K react vigorously with cold water, calcium also reacts with cold water but comparatively less vigorous



b) magnesium does not react with cold water ,It reacts with hot water to form magnesium oxide and hydrogen gas .



c) Metals like aluminium , zinc and iron do not react with cold or hot water but they react with steam and form their respective oxides and hydrogen gas .

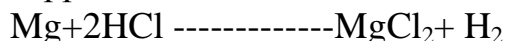


d) Copper doesn't react with cold or hot water and also with steam.

24) What happens when metals react with dilute acids ?

Ans) metals react with acids forming salt and hydrogen gas .

Copper doesn't react with dilute acids forming hydrogen gas .



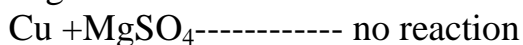
25) Metals do not produce hydrogen gas when they react with nitric acid. Give reason.

Ans) Nitric acid is a strong oxidizing agent .It oxidizes hydrogen into water and itself get reduced to any oxide of nitrogen (NO₂, NO, N₂O)

26) How do metals react with salts of other metal salts ?

Ans) A more reactive metal can displace a less reactive metal from its salt solution .This is called displacement reaction. These are exothermic reactions .

Fe + CuSO₄ ----- FeSO₄ + Cu (iron get coating of copper and the solution turns from blue to greenish due to formation of ferrous sulphate)

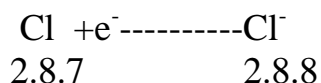
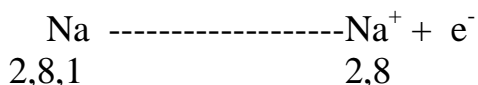


27) What does it mean by stability of atoms ?

Ans) Stability of atoms means having inert gas configuration(8 electrons in the outermost shell)

28) Show the formation of sodium chloride .

Sodium has atomic number 11 and chlorine has atomic number 17. The configurations are 2,8,1 and 2,8,7 respectively .Sodium loses one electron to achieve stability and chlorine accepts that electron .



The positive and negative ions attract and form an ionic bond (Na⁺Cl⁻)

29) State the characteristics of electrovalent or ionic compounds

Ans) Electrovalent or ionic compounds are generally solids and crystalline in nature

They are good conductors of electricity in aqueous and molten state but not in solid state .
(because in solid state the cations and anions are held together by electrostatic forces of attraction)

They have high melting and boiling points (this is due to strong electrostatic forces of attraction between oppositely charged ions)

They dissolve in water .

30) Gold and silver often occur in free state ,give reason

Ans) They are often found in free state because they do not chemically react with air and water etc.

31) What are minerals and ores?

Ans) The inorganic compounds which occur naturally in the earth's crust are called minerals. Eg cuprite (Cu_2O) , copperpyrites (CuFeS_2)

32) Those minerals which have a higher percentage of metal , and the metal can be extracted easily and profitably are called ore.

33) What is gangue?

Ans) The unwanted impurities of sand and rocky material (earthly) present in an ore is called gangue.

34) What is concentration of ore ?

Ans) enrichment of ore and removing most of the gangue particles is called concentration of ore.

35) Differentiate between roasting and calcinations

1) Roasting is done in the presence of excess air and calcinations is done in the absence of air

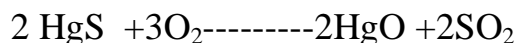
2) Roasting is done for sulphide ores and calcinations is done for carbonate ores.

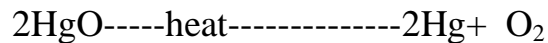
3) In roasting SO_2 gas is evolved and in calcinations CO_2 gas is evolved.

36) How are the following metals extracted

a) metals which are low in the reactivity series

Metals which are low in the reactivity series are not very reactive they can be extracted by heating alone eg mercury from cinnabar

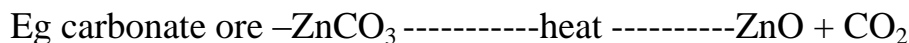




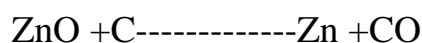
Metals in the middle of the reactivity series

First the ores are converted into their respective oxides, by either roasting and calcinations

For example carbonate ores are calcined and sulphide ores are roasted. Once the ore is converted into metal oxide, then reduction is done using conventional reducing agent.



The oxide is then reduced using carbon

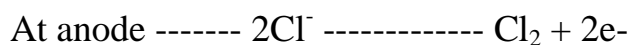
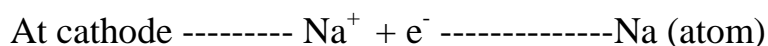


Metals which are high in the reactivity series (reactive metals)

They are extracted by electrolysis. They cannot be obtained by reduction with carbon, this is because these metals have more affinity for oxygen than carbon.

Eg extraction of sodium from sodium chloride

During electrolysis of molten sodium chloride, sodium is obtained at the cathode and chlorine at anode



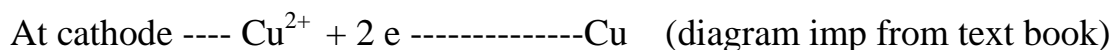
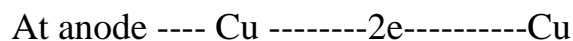
37) Write a short note on refining of metals Or refining of copper

In this process the cathode is made of pure metal and the anode is made of impure metal.

It is carried out in an electrolytic cell. The electrolyte is the salt solution of simple or complex salt of the concerned metal.

During refining of copper, the electrolyte is copper sulphate and few drops of sulphuric acid.

The cathode is a pure copper rod and the anode is impure copper rod.



38) What is an alloy? Why are alloys made ?

Ans) Alloys are homogeneous mixtures of two or more metals or metals and nonmetals. Alloys are made in order to enhance the properties of metal and to obtain desired properties.

39) What is amalgam ?

Ans) an alloy of mercury with other metals is called amalgam

Eg sodium amalgam

40) Name the constituent metals in

Brass—Cu and Zn

Bronze —Cu and Sn (tin)

Steel ---Fe and carbon

Stainless steel-----Carbon ,iron nickel chromium,

Solder —lead and tin

Magnalium-----Aluminium and magnesium

Gold is alloyed so that we can make jewellery from it otherwise gold is very soft and jewellery may break.