CBSE Test Paper-01

Chapter 03 Metals and Non Metals

---

1. Metal always found in free state is? **(1)**

    a. Sodium
    b. Lithium
    c. Copper
    d. Gold

2. Roasting is a method of heating ore**: (1)**

    a. In the absence of water.
    b. In the presence of water.
    c. In the absence of air.
    d. In the presence of air.

3. Ayush is putting H_2SO_4 in the test tube containing water whereas Piyush is putting water in the lest tube containing H_2SO_4. Which of the two is likely to face danger? **(1)**

    a. Piyush
    b. Ayush
    c. None of the two
    d. Both Ayush and Piyush

4. The group of metals which do not react with oxygen**: (1)**

    a. All of these
    b. Na, Cs
    c. Au, Ag
    d. Pt, Cu

5. Magnesium imparts**: (1)**

    a. Dazzling white colour flame

b. Yellowish orange colour flame
c. None of these
d. Brick red colour flame

6. A non-metal X exists in two different forms Y and Z. Y is hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y arid Z. **(1)**

7. Why are metals reducing agents where as non metals are oxidizing agents? **(1)**

8. Name two metals which will displace hydrogen from dilute acids, and two metals which will not? **(1)**

9. Name two metals that do not react with water at all. **(1)**

10. State the property utilised in the following: **(3)**

    i. Graphite in making electrodes.
    ii. Electrical wires are coated with Polyvinyl Chloride (PVC) or a rubber-like material.
    iii. Metal alloys are used for making bells and strings of musical instruments.

11. Choose from the following metals to answer the questions below: **(3)**
    Aluminium, calcium, copper, iron, magnesium, potassium, nickel and zinc. Name a metal which

    i. is manufactured by the electrolysis of its molten oxide.
    ii. is used to galvanise iron
    iii. is alloyed with zinc to make brass.
    iv. reacts with aqueous copper (II) sulphate to give a pink solid.
    v. does not react with cold water.

12. How will you show that silver is less reactive than copper? **(3)**

13. Why metals replace hydrogen from dilute acids, whereas non-metals do not? **(3)**

14. i. Distinguish between ionic and covalent compounds under the following properties: **(5)**
        a. Strength of forces between constituent elements

b. Solubility of compounds in water
c. Electrical conduction in substances

ii. Explain how the following metals are obtained from their compounds by the reduction process:
a. Metal M which is in the middle of the reactivity series.
b. Metal N which is high up in the reactivity series. Give one example of each type.

15. i. Write the electron-dot structures for sodium, oxygen and magnesium.
ii. Show the formation of Na_2O and MgO by the transfer of electrons.
iii. What are the ions present in these compounds? **(5)**

CBSE Test Paper-01

Chapter 03 Metals and Non Metals

Answers

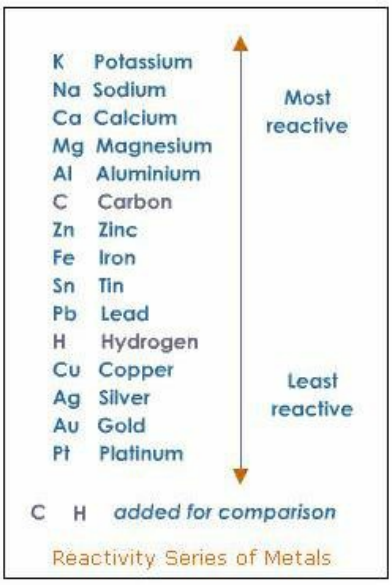
1. d. Gold
   Explanation: Gold, platinum, copper, silver are few metals which can be found in free state, because they are unreactive in normal conditions with air, water and other chemicals.
2. d. In the presence of air.
   Explanation: Roasting is heating of an ore in a regular supply of air in a furnace.
3. a. Piyush
   Explanation: Piyush is likely to face danger. Addition of water to concentrated sulphuric acid is an exothermic reaction and can lead to explosions. Water should not be poured into a container containing an acid.
4. c. Au, Ag
   Explanation: Gold and **Silver** do not react with oxygen. They are less reactive metals and lie at the bottom of the **reactivity series**.
5. a. Dazzling white colour flame
   Explanation: Magnesium burns in air with a dazzling white flame.
6. The non-metal X is carbon (C). Y and Z are the allotropes of carbon (different physical forms of carbon). Y is diamond because diamond is the hardest natural substance known and Z is graphite which is a good conductor of electricity.
7. Metals have a tendency to donate electrons and get oxidized. Thus, they are reducing agents.
   Non- metals on the other hand have a tendency to gain electrons and get reduced. Therefore, they are oxidizing agents.
8. Sodium and calcium, being more reactive than hydrogen can displace hydrogen from dilute acids.

Copper and silver, being less reactive than hydrogen cannot displace hydrogen from dilute acids.

9. Lead and copper.

10. i. Graphite in an allotrope of carbon which is a good conductor of electricity because of presence of free electron and it is cheap, insoluble in water, do not react with acids and bases (non-corrosive). Due to these properties, it is used in making electrodes.
    ii. Polyvinyl Chloride (PVC) or a rubber-like material are insulators means they are bad conductors of electricity and hence do not allow electrons to flow. Hence, these are used in coating the electrical wires.
    iii. Metal alloys are used for making bells and strings of musical instruments because they are sonorous.
11. i. The metal which is manufactured by the electrolysis of its molten oxide is Aluminium.
    ii. Zinc is used to galvanise iron, because it is more reactive.
    iii. Copper is alloyed with zinc to make brass.
    iv. Iron reacts with aqueous copper (II) sulphate to give a pink solid.
    v. Iron has no reaction with cold water but it reacts with steam.

12. In activity series silver is placed below the copper. hence copper is more reactive than silver.



The more reactive element can displace the less reactive element from its solution.

take two test tubes in test tube -1 take silver Sulphate solution(white in color) & in test tube-2 take copper Sulphate solution (blue in color). Add copper turnings to test tube -1 and add silver piece to test tube -2 keep the test tubes undisturbed for 15 minutes. After sometime observe the color changes in both test tubes. The color in test tube – 1 changed from white to blue and there is no color change in test tube-2.this indicates in test tube-1 copper displaces silver from its silver Sulphate solution forms copper Sulphate. And in test tube- 2 no displacement reaction takes place. Hence from this experiment we are proving that copper is more reactive than silver.

13. The reason why non-metals do not displace hydrogen from dilute acids is because unlike metals, non-metals do not have a tendency to lose electrons but to gain electrons. Metals have a tendency to lose electrons. These electrons, which are readily lost by reactive metals like sodium, potassium etc are accepted by hydrogen ions of the acids, reducing them to hydrogen gas (H_2)

    $2H^+ + 2e^- \rightarrow H_2$

    However, non-metals do not lose electrons readily, because of which they do not displace hydrogen from acids. Another important point to note is that not all metals will displace hydrogen from acids. Only those metals which are reactive than hydrogen will displace H_2 from acid.

14. i. a. Ionic compounds have strong force of attraction between the oppositely charged ions (e.g., Na^+ and Cl^-), so they are solids. Covalent compounds have weak force of attraction between their molecules, so they are usually liquids or gases.
    b. Ionic compounds are soluble in water but covalent compounds are insoluble in water.
    c. Ionic compounds conduct electricity when dissolved in water or when melted because they contain ions (charged particles). But, covalent compounds like glucose do not conduct electricity because they do not contain ions.

    ii. a. The metal M which is in the middle of the reactivity series (such as iron, zinc, lead, copper, etc.) is moderately reactive. So, for obtaining such metals from their compounds, their sulphides and carbonates (in which they are present in nature) are first converted into their oxides by the process of roasting and

calcination respectively. For example,

$$\underset{\substack{Zinc\ Sulphide\\(Sulphideore)}}{2ZnS\,(s)} + 3O_2\,(g) \xrightarrow{Heat} 2ZnO\,(s) + 2SO_2\,(g)$$

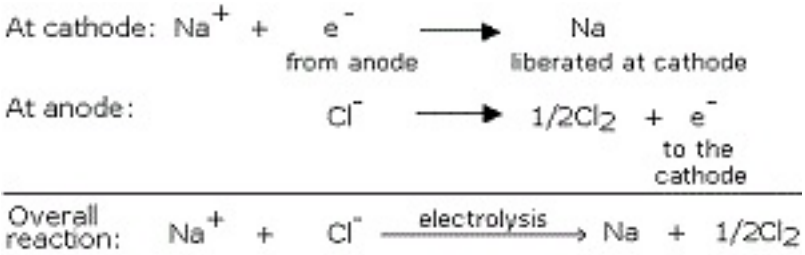
$$\underset{\substack{Zinc\ Carbonate\\(Carbonate\ are)}}{ZnCO_3\,(s)} \xrightarrow{Heat} ZnO\,(s) + CO_2\,(g)$$

The metal oxide (MO) are then reduced to the corresponding metals by using suitable reducing agents such as carbon. For example, zinc metal from its oxide is obtained as follow:

$$\underset{Zinc\ oxide}{ZnO(s)} + C(s) \rightarrow \underset{Zinc}{Zn(s)} + CO(g)$$

b. The metal N which is high up in the reactivity series (such as sodium, magnesium, calcium, aluminium, etc.), is very reactive and cannot be obtained from its compound by heating with carbon.

Therefore, such metals are obtained by electrolytic reduction of their molten salt. For example, sodium is obtained by the electrolysis of molten sodium chloride ($NaCl$).



15.

Metal	Symbol	Atomic number	Electronic configuration K, L, M, N	No. of outermost electrons	Electron dot structures
Sodium	Na	11	2,8, 1	1	Na.
Oxygen	O	8	2,6	6	:O::
Magnesium	Mg	12	2,8, 2	2	Mg:

ii. Formation of Na_2O:

The atomic number of sodium is 11 and it has only one valence electron.

Hence, electronic configuration of ${}_{11}Na$ is 2, 8, 1.

The atomic number of oxygen is 8 and it has 6 electrons in its valence shell.

Hence, electronic configuration of ${}_8O$ is 2, 6.

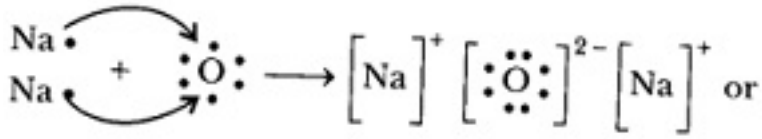
Sodium has a tendency to lose the valence electron and oxygen has a tendency to gain the electron lost by sodium. Since, sodium can lose only one electron of the valence shell, and oxygen atom needs two electrons to complete its octet in the valence electron, two atoms of sodium combine with one atom of oxygen. By losing valence electron, sodium is changed into Na^+ and by gaining two electrons lost by two sodium atoms, oxygen atom is changed into an oxide anion, O_2 .In this process , both the atoms, sodium and oxygen, obtain the stable electronic configuration of the noble gas neon.

$$\underset{2,8,1}{Na} \rightarrow \underset{2,8}{Na^+} + e^- O^{2-}$$

$$\underset{2,6}{O} + 2e^- \rightarrow \underset{2,8}{O^{2-}}$$

$$2Na^+ + O^2 \rightarrow 2Na^+O^{2-} \; or \; Na_2O$$

The oppositely charged sodium ion, Na^+O^{2-} and oxide ion, O^{2-} are now held together by electrostatic force of attraction or by ionic or electrovalent bond. Na_2O is, therefore, an ionic or electrovalent compound.



Formation of MgO:

The atomic number of magnesium = 12

Its electronic configuration is $\underset{2,}{K}, \underset{8,}{L}, \underset{2}{M}$

It has two electronic in its outermost shell. So, the magnesium atom donates its 2 valence electrons and forms a stable magnesium ion, Mg^{2+} to attain the electronic arrangement of neon atom.

$$\underset{2,8,2}{Mg} \rightarrow \overset{2+}{\underset{2,8}{Mg}} + 2^{e-}$$

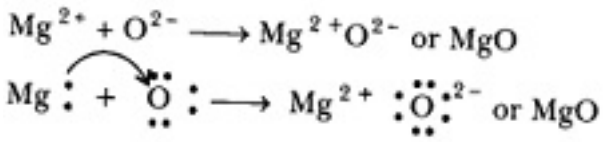
The atomic number of oxygen = 8

Electronic configuration = $\underset{2}{K}, \underset{6}{L}$

It has 6 electrons in its valence shell. Therefore, it requires 2 more electrons to attain the stable electronic arrangement of neon gas. Thus, oxygen accepts 2 electrons donated by magnesium atom and forms a stable oxide ion, O^{2-}

$$\underset{2,6}{O} + 2e^- \rightarrow \overset{2-}{\underset{2,8}{O}}$$

The oppositely charged magnesium ions, Mg^{2+}, and oxide ions, are held together by a strong force of electrostatic attraction to form magnesium oxide compound. $Mg^{2+}O^{2-}$ *or* MgO.



MgO is ionic compound.

iii. The ions present in Na_2O are sodium ions ($2Na^+$) and oxide ion O^{2-}.

The ions present in MgO are magnesium ion (Mg2+) and oxide ion O^{2-}.

CBSE Test Paper-02

Chapter 03 Metals and Non Metals

1. An element belonging to 16th group of periodic table is used in the manufacturing of vulcanized rubber. This element reacts with hot and conc. HNO_3 to form sulphuric acid. The concerned element is**: (1)**
   a. Oxygen
   b. Sulphur
   c. Germanium
   d. Silicon
2. Malachite is an ore of**: (1)**
   a. Mercury
   b. Zinc
   c. Iron
   d. Copper
3. Name the reducing agent in the following reaction**: (1)**

   $3MnO_2 + 4Al \rightarrow 3Mn + 2Al_2O_3$
   a. $\mathrm{Al_2O_3}$
   b. Al
   c. $\mathrm{MnO_2}$
   d. Mn
4. Cryolite is used in the electrolytic reduction of Alumina $(\mathrm{Al_2O_3})$ to**: (1)**
   a. Decrease the melting point of $\mathrm{Al_2O_3}$
   b. All of these
   c. Act as a flux to separate gangue.
   d. To slow down the reaction.
5. Which of the following metal reacts neither with cold water nor with hot water but reacts with hot steam to produce hydrogen gas? **(1)**
   a. Mg
   b. Fe
   c. Ca
   d. Na

6. Name one property which is not shown by ionic compounds. **(1)**
7. Why does calcium float in water? **(1)**
8. Give an example of metal which can be easily cut with a knife. **(1)**
9. Can all minerals of a metal act as ores? Justify. **(1)**
10. A, B and C are 3 elements which undergo chemical reactions according to following equations: **(3)**
    a. $A_2O_3 + 2B \rightarrow B_2O_3 + 2A$
    b. $3CSO_4 + 2B \rightarrow B_2(SO_4)_3 + 3C$
    c. $3CO + 2A \rightarrow A_2SO_3 + 3C$

    Answer of the following:
    i. Which element is most reactive?
    ii. Which element is least reactive?
11. What property is made use of in the concentration of ore by: **(3)**
    i. gravity separation
    ii. froth floatation process?
12. A piece of granulated zinc was dropped into copper sulphate solution. After sometime the colour of the solution changed from blue to colourless. Why? **(3)**
13. What would happen to copper vessel if it is left for a few days in humid atmosphere without being cleaned? **(3)**
14. You are given a hammer, a battery, a bulb, wires and a switch. **(5)**
    i. How could you use them to distinguish between samples of metals and non-metals.
    ii. Assess the usefulness of these tests in distinguishing between metals and non-metals.
15. Give reasons: **(5)**
    i. Platinum, gold and silver are used to make jewellery.
    ii. Sodium, potassium and lithium are stored under oil.
    iii. Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
    iv. Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
    v. Lemon or tamarind juice are effective in cleaning tarnished copper vessels.

CBSE Test Paper-02

Chapter 03 Metals and Non Metals

Answers

1. b. Sulphur

   Explanation: The element is Sulphur. Sulphur is used to manufacture sulphuric acid and in the vulcanisation of rubber. $S + 2HNO_3 \dashrightarrow H_2SO_4 + 2NO$

2. d. Copper

   Explanation: Malachite is a copper carbonate hydroxide mineral with the formula $\mathbf{CuCO_3.Cu(OH)_2}$

3. b. Al

   Explanation: Aluminium is the reducing agent in the reaction. It reduces manganese dioxide (MnO_2) to manganese (Mn) and itself gets oxidised to aluminium oxide. Manganese dioxide acts as an oxidising agent.

4. a. Decrease the melting point of Al_2O_3

   Explanation: The difficulty of separating aluminium from oxygen in the alumina is overcome by the use of cryolite as a flux to dissolve the oxide mineral. Pure cryolite melts at 1012 °C. It dissolves the aluminium oxides sufficiently well to allow easy extraction of the aluminium by electrolysis.

5. b. Fe

   Explanation: Sodium reacts vigorously with water. Such is the reaction that it has to be stored under kerosene. Calcium can react with cold water. Magnesium reacts with hot water. Heated iron reacts with water when hot steam is passed over it.

   $3Fe\ (s) + 4H_2O\ (g) \dashrightarrow Fe_3O_4\ (s) + 4H_2\ (g)$

6. Ionic compounds do not conduct electricity in the solid state.
7. Calcium is heavier than water which should sink in water but when calcium metal is dropped in water it flows because it reacts with water to form hygrogen gas and due to the sticking of the H_2 gas bubbles on calcium metal surface, it starts floating.
8. Sodium and potassium are metals which can be easily cut with a knife.

9. Only those minerals can act as ores from which a metal can be conveniently and profitably extracted.
10. i. Most reactive element is B as it has replaced both A and C from their compounds.
    ii. Element C is least reactive as it has been replaced both by A and B.
11. i. In the gravity separation process, the densities of ores and the gangue are the basis of concentration process.
    ii. In the froth floatation process, the difference in the wetting properties of the ore particles and gangue particles with water and oil is the basis of concentration process.
12. Zinc is above copper in the reactivity series, so zinc is more reactive than copper, hence Zinc displaces copper from its (copper's) salt solution.

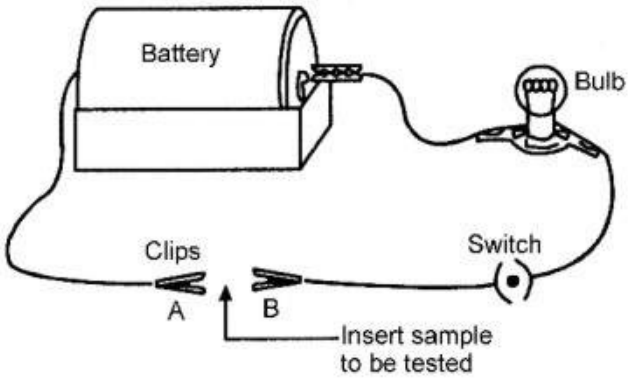
    $CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$

    The colour of $CuSO_4$ solution was blue, which changed to colourless due to formation of $ZnSO_4$ solution, which is colourless.
13. Copper is not affected by dry air at ordinary temperature. On exposure to moist air, it gets covered with a beautiful green coating of either basic carbonate or basic sulphate.

    $2Cu + H_2O + CO_2 + O_2 \rightarrow CuCO_3.Cu(OH)_2$

    $8Cu + 6H_2 + 2SO_2 + 5O_2 \rightarrow 2[CuSO_4.3Cu(OH)_2]$

    Copper present in bronze or in utensils is corroded by moist air containing acidic oxides like carbon dioxide, sulphur dioxide etc. The greenish layer formed is of basic copper carbonate or basic copper sulphate. This phenomenon is called ‘corrosion of metals’.
14. i. Set up the electric circuit as shown ahead :



Insert the sample to be tested between clips A and B If the bulbs glows, the sample

is metal. If the bulb does not glow, the sample is non-metal. Thus metals are good conductors of electricity whereas non-metals are poor conductors of electricity.

ii. If a substance produces a sound when struck beating with hammer, it is a metal and if no sound is produced, it is a non-metal. Metals are sonorous whereas non-metal are non-sonorous.

15. a. Platinum, gold and silver are used to make jewelry because of their bright shiny surface and high resistance to corrosion. Also they have high malleability and ductility.

b. Sodium, potassium and lithium are stored under oil to prevent their reaction with oxygen, moisture and carbon dioxide of air so as to protect them.

c. Aluminum metal forms a thin layer of aluminum oxide all over its surface under the action of moist air. This layer prevents the metal underneath from further corrosion. It is cheap, easily available, malleable and ductile. Therefore, it is used to make utensils for cooking.

d. It is easier to obtain a metal from its oxides as compared to its sulphides and carbonates. So, prior to reduction, metal carbonate and sulphides must be converted into metal oxides. A carbonate ore is converted into oxide by calcination whereas a sulphide ore is converted into oxide by roasting.

e. When copper vessels are exposed to moist air, they form a green coating of basic copper carbonate [$CuCO_3 . Cu(OH)_2$].

$$2Cu + \underset{From\ Moistair}{CO_2 + O_2 + H_2O} \rightarrow \underset{Basic\ Copper\ \ Carbonate\,(Green)}{CuCO_3 . Cu(OH)_2}$$

The sour substances such as lemon or tamarind juice contain acids. Lemon juice contains citric acid and tamarind contains tartaric acid. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

CBSE Test Paper 03

Chapter 03 Metal and Non Metals

---

1. Which of the following has electrovalent bond(s)?

   A. CaF

   B. NaCl

   C. MgO

   D. CO_2

   a. A and C
   b. A, B and C
   c. All of these
   d. C and D

2. $2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO$ In the above reaction 'C' acts as**: (1)**
   a. Dehydrating agent
   b. Reducing agent
   c. Oxidising agent
   d. Catalyst

3. During smelting, an additional substance is added which combines with impurities to form a fusible product known as**: (1)**
   a. Flux
   b. Slag
   c. Gangue
   d. Mud

4. $P_4 + NaOH + 3H_2O \rightarrow X + 3NaH_2PO_2$ What does 'X' indicate here? **(1)**
   a. PH_3
   b. P_2O_3
   c. P_2O_5
   d. H_3PO_4

5. The common method for extraction of metals from the oxide ore is**: (1)**
   a. Reduction with aluminium
   b. Reduction with hydrogen

c. Reduction with carbon
d. Electrolytic method

6. Why copper is used to make hot water tanks and not steel? **(1)**

7. Name the iron compound in haematite. Write its chemical formula. **(1)**

8. Why do some metals like, Na, K, Ca, Mg not occur in nature as free elements? **(1)**

9. Write chemical equation for reaction taking place when: Manganese dioxide is heated with aluminium powder. **(1)**

10. Royal water is prepared by mixing two acids A and B. It can dissolve gold and platinum. It is highly corrosive and fuming liquid. Identify A and B. What is the ratio in which A and B are mixed? **(3)**

11. i. Distinguish between 'roasting' and 'calcination'. Which of these two is used for sulphide ores and why?
    ii. Write a chemical equation to illustrate the use of aluminium for joining cracked railway lines.
    iii. Name the anode, the cathode and the electrolyte used in the electrolytic refining of impure copper. **(3)**

12. Why are noble gases unreactive? **(3)**

13. What is an alloy? Give the composition of an alloy? Give the composition of an alloy called magnalium. Give its two uses. **(3)**

14. i. Hydrogen is not a metal but it has been assigned a place in the reactivity series of metals. Explain.
    ii. How would you show that silver is chemically less reactive than copper? **(5)**

15. What is ionic or electrovalent bond? How is it formed? **(5)**

CBSE Test Paper 03

Chapter 03 Metal and Non Metals

Answers

1. b. A, B and C
   Explanation: Carbon is a tetravalent element and does not lose or gain electrons easily to form electrovalent bonds. It forms covalent bonds with other elements.
2. b. Reducing agent
   Explanation: Carbon acts as a reducing agent and gets oxidised in the process of reducing iron oxide to iron.
3. b. Slag
   Explanation: During the smelting of iron, limestone is added as a flux. The temperature inside the blast furnace decomposes limestone to calcium oxide which removes silicate impurity. Impurities like silicon are passed into the slag. The metal is separated from the molten slag.
   $CaCO_3$ à CaO + CO_2 ; CaO + SiO_2 à $CaSiO_3$ (Slag)
4. a. PH_3
   Explanation: Product X in the reaction indicates **phosphine** (IUPAC name: **phosphane**). The other product is sodium hypophosphite.
5. c. Reduction with carbon
   Explanation: The common method of reduction of a metal oxide to the metal involves heating the metal oxide with a reducing agent such as carbon. The reducing agent (C) combines with oxygen, gets oxidised (to CO) and reduces the metal oxide to its metal. The reaction is:
   $M_yO_z + zC \rightarrow yM + zCO$ (y and z are positive integers)
6. Copper is used to make hot water tanks because it is a good conductor of heat in comparison to steel.
7. Iron (III) oxide is the compound of iron in haematite. Its chemical formula is Fe_2O_3.

8. Metals like Na, K, etc (alkali metals) and Ca, Mg etc (alkaline earth metals) are very reactive and hence they react with atmosphere oxygen and carbon dioxide and also with other non-metals like sulphur present in the earth's crust to form compounds like oxides, carbonates, sulphides, sulphates and chlorides. So they do not occur in free state, but are found in the form of the above compounds.

9. $3MnO_2(s) + 2Al\ (s) \rightarrow 2Al_2O_3\ (s) + 3Mn\ (s)$

   Aluminium powder is a reducing agent. These displacement reactions are so exothermic that the metals are produced in the molten state.

10. The royal water called aqua regia is the mixture of 3 parts of HCl and 1 part of HNO_3.

    It is used by the jewellers to clean the gold ornaments.

11. i. Roasting: It is the process in which sulphide ores of the metals are converted into oxides by heating them in the presence of excess air. For example, zinc sulphide is converted into zinc oxide by roasting.

    $$2ZnS\,(s) + 3O_2(g) \underset{Roasting}{\overset{Heat}{\longrightarrow}} 2ZnO\,(s) + 2SO_2\,(g)$$

    Calcination: It is the process in which carbonate ores of the metals are decomposed into oxides by heating them in the absence or limited air. For example, zinc carbonate is decomposed into zinc oxide and carbon dioxide by calcination.

    $$ZnCO_2\,(s) \underset{Calcination}{\overset{Heat}{\longrightarrow}} ZnO\,(s) + CO_2\,(g)$$

    ii. Out of roasting and calcination, only roasting is used for sulphide ores. This is because it is easier to obtain metal from its oxide as compared to its sulphide.

    $$\underset{Iron(III)\ Oxide}{Fe_2O_3\,(s)} + \underset{\text{Aluminium}}{2AI\,(s)} \overset{\Delta}{\longrightarrow} \underset{Molten\ iron}{2Fe\,(l)} + \underset{\text{AluminiumOxide}}{A_2O_3\,(s)}$$

    iii. Anode - Impure copper

    Cathode - Strip of pure copper

    Electrolyte - Acidified copper sulphate solution.

12. Elements of group 0 are called noble gases. These elements have stable arrangements of electrons in their outermost shell. The chemical reactivity of a group highly depends on the number of electrons in the outermost shell. A stable element generally has 8 electrons in their outermost shell with some exceptions of elements with higher

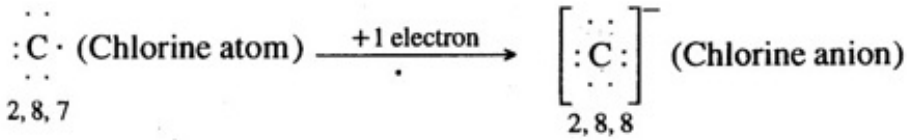
atomic masses and helium. If the element has less than 8 and greater than 4 electrons in their outermost shell of the valence shell it will undergo a chemical reaction to gain some electrons from a different element whereas if it has less than four electrons in the valence shell it tends to lose them all in order to gain a stable state.
However, in case of noble gases or group 0 elements the outermost shell contains 8 electrons (2 in case of Helium) which is a stable state configuration. Hence, they are chemically unreactive or inert.

13. An alloy is a homogeneous mixture of two or more metals or a metal and non-metal. For example, brass is an alloy of copper and zinc.
Composition of magnalium: Al : 85 - 99%
Mg : 15-1%
Uses.
    i. Being light and hard, it is used in making light instruments.
    ii. It is used in making parts of automobiles, pressure cooker etc.
14. i. Though hydrogen is not a metal but even then it has been assigned a place in the activity series. The reason is that like metals, hydrogen also has a tendency to lose electron and forms a positive ion H^+.
    The metals which lose electrons less readily than hydrogen are placed below it and the metals which lose electrons more readily than hydrogen are placed above it in the reactivity series of metals.
    ii. By displacement reaction silver can be shown to be chemically less reactive than copper or copper is more reactive than silver. If a piece of silver is immersed in a solution of copper sulphate, no reaction will take place because silver is less reactive than copper and will not displace copper from the copper sulphate solution.
    $CuSO_4(aq) + Ag(s) \rightarrow No reaction$
    On the other hand, if a copper plate is placed in a solution of silver nitrate, copper will slowly displace silver from the solution and blue solution of copper nitrate is formed.
    $\underset{Colourless}{2AgNO_3(aq)} + Cu(s) \rightarrow \underset{Blue}{Cu(NO_3)_2(aq)} + 2Ag(s)$
    This shows that copper is more reactive than silver.

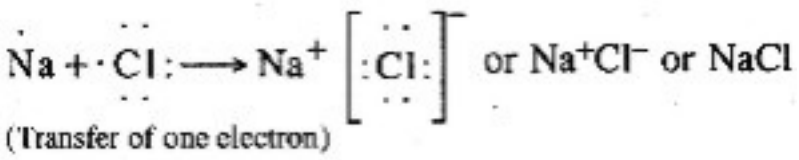
15. Ionic or Electrovalent bond may be defined as:
A bond which is formed between two different atoms by the transfer of one ore more electrons from one atom to the other atom.
Formation of Ionic Bond. We have stated that the ionic bond is formed by the transfer of electrons from one atom to the other atom. Actually, both the atoms taking part in the bond formation have incomplete outermost energy shells. For example, let us take the example of Na and Cl atoms. Na atom has one valence electron (2, 8, 1). Similarly, Cl atom has seven valence electrons (2, 8, 7). Both these atoms take part in bond formation to have eight electrons in the valence shell. Sodium loses the only electron present in the valence shell and forms a cation:

Na (sodium atom) $2,8,1 \xrightarrow{-1\ electron}$ Na^+ (sodium cation) $2,8$

The electron released by sodium atom is taken up by the chlorine atom which has already seven valence electrons. Chlorine changes to an anion as follows



Both the Na^+ ion and Cl^- ion have stable electronic configuration.Na^+ ion has the configuration of the noble gas neon. Similarly, Cl^- ion has the configuration of noble gas argon. The oppositely charged ions are attracted towards each other. The attraction leads to the formation of ionic bond which is also called electrovalent bond. The formation of NaCl may be represented as follows:



The formation of ionic bond can also be shown as follows: