

Book : Science Mission Class 08 Chapter 04- Metal and Non Metals

A. Multiple choice questions

1. Which one of the following is a non-metal?

- (a) Sodium (b) Potassium (c) Sulphur (d) Platinum

Ans . Sulphur

2. Property of metal to be drawn into wire is known as

- (a) Malleability (b) Ductility (c) Lustrous (d) Tensile strength

Ans. Ductility

3. Property of metal to be beaten into thin sheet is known as

- (a) Malleability (b) Ductility (c) Lustre (d) Tensile strength

Ans. Malleability

4. Metal used in galvanising iron is

- (a) Zinc (b) Nickel (c) Tin (d) Aluminium

Ans. Zinc

5. Which one of the following is a metal?

- (a) Graphite (b) Iodine (c) Phosphorus (d) Magnesium

Ans. Magnesium

6. Which metal is a liquid at room temperature?

- (a) Magnesium (b) Aluminium (c) Mercury (d) Zinc

Ans. Mercury

7. Which metal will replace iron from iron sulphate solution?

- (a) Zinc (b) Gold (c) Copper (d) Silver

Ans. Zinc

8. A non-metal existing in liquid state at room temperature

- (a) Carbon (b) Chlorine (c) Bromine (d) Iodine

Ans. Bromine

9. A basic oxide is formed on oxidation of

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

Ans. Sodium

10. Which of the following will form acidic oxide?

- (a) Sodium (b) Potassium (c) Sulphur (d) Iron

Ans. Sulphur

11. Which of the following metals cannot be drawn into wire?

- (a) Zinc (b) Copper (c) Silver (d) Gold

Ans. Zinc

12. Which one of the following characteristics is correct?

(a) All metals are malleable (b) All non-metals are malleable

(c) Most metals are malleable (d) Most non-metals are malleable

Ans. C

13. Which of the following metal is soft enough to cut with a knife?

(a) Sodium (b) Copper (c) Aluminium (d) Iron

Ans. Sodium

14. Which of the following is the most reactive metal?

(a) Gold (b) Silver (c) Potassium (d) Iron

Ans. Potassium

B. State whether 'true' or 'false'

1. Mercury is a liquid metal. T

2. Non-metals are good conductor of heat. False

3. Bromine is the only liquid non-metal. True

4. Oxide of a metal is acidic in nature. False

5. Copper replaces iron from iron sulphide solution. False

6. Metals are sonorous. True

7. Non-metals are ductile. False

8. Gold gets corroded when it reacts with water. False

9. Hydrogen gas is evolved when a metal reacts with an acid. True

10. Graphite and diamond are non-metals. True

11. Metalloids are good conductors of electricity. False

12. Nickel-plating on iron is to protect it from corrosion. True

13. Hydrogen gas is evolved when a piece of sodium metal is placed on water. False

14. Metals react with oxygen to produce acidic oxides. False

15. Zinc metal can displace copper from copper sulphate solution. True

C. Give one word answer.

1. Property of a substance which can be beaten into a foil.

Ans. Malleability

2. Property of a substance which can be drawn into wire. Ans. Ductility
3. A substance that gives out a metallic sound when struck. Ans. Sonorous
4. A material which is capable of conducting heat and electricity. Ans: Good Conductor like Copper
5. A kind of carbon used in writing pencils. Ans. Graphite
6. A metal which is stored in kerosene. Ans. Sodium
7. A non-metal which is stored in water. Ans. Phosphorus
8. Elements between metals and non-metals. Ans. Metalloid
9. Name of a wax like soft metal. Ans. Sodium
10. Name of a metal which is a liquid at room temperature. Ans. Mercury
11. Name a non-metal which is lustrous and a good conductor of electricity. Ans. Graphite

Theoretical Questions Answer

A. Short answer type questions.

1. Give reasons for the following:

(a) Phosphorus is stored under water.

Ans: Phosphorus is highly reactive with oxygen and catches fire when exposed to air so it is stored in water.

(b) Sodium metal is stored under kerosene.

Ans: Sodium combines very quickly with the oxygen in the air and water even at a low temperature; hence it is stored in kerosene.

(c) Graphite is used in dry cells.

Ans: Graphite used as electrodes in cells and batteries because it is good conductor of electricity and it does not react with other chemicals.

(d) Electric wires are made from aluminium and copper.

Ans: This is because aluminium and copper are ductile and good conductor.

(e) Soft iron nail kept in the solution of copper sulphate gets coated with copper.

Ans: Iron from the nails displaces copper from the copper sulphate solution, thus turning blue copper

sulphate solution into a greenish black iron sulphate solution. Thus, iron from the nails has gone into the solution replacing copper and in turn, copper from the solution gets deposited on the iron nails.

(f) Zinc is used for coating iron for protection against corrosion.

Ans. Iron gets easily rusted in the presence of moisture. Therefore, to protect from rusting iron sheets are coated with a layer of zinc by dipping the iron objects in molten zinc. Coating iron with zinc is called galvanizing.

(g) Jewellery is made from silver, gold and platinum.

Ans. Gold, silver and platinum are highly lustrous and non-corrosive hence They are used in making jewellery

(h) Chlorine is used for purification of water.

This is because chlorine kill disease causing organism(germs) by destroying cell wall.

(i) Nitrogen gas is used in sachets storing food.

This is because nitrogen is antioxidant prevent oxidation of food.

(j) Nitrogen is an essential part of plant nutrition.

Plants synthesis proteins and other products from nitrogen. Plants use nitrogen in the form of nitrates and nitrites to form plant protein Ammonia. Plant and animal body is mainly protein which comes from nitrogen..

(k) Metalloids are placed between metals and non-metals.

This is because metalloid have both the properties of metals and Non metals.

(l) A copper vessel loses its shine after a few days of exposure to moisture.

This because copper react with moist carbon dioxide and form green layer of basic copper carbonate .

(m) Silver can be beaten into sheets.

Silver is highly malleable so it can be beaten into sheets.

(n) Copper and aluminium are used to make cooking utensils.

Cu and Al or their alloy are good conductor of heat. Copper conducts heat uniformly whereas aluminium is not. Hence utensils made from aluminium are given a copper base to cooking utensils.

(0) Overhead cables (on tower lines) are made from aluminium and not copper.

Aluminium is lighter in weight, available in abundance and cheaper than copper hence is used in overhead cables .

2. Why zinc cannot be beaten to sheets?

This because zinc is brittle at room temperature and break into pieces on hammering. Zinc becomes ductile and malleable when heated between 110°C and 150°C . hence it can be beaten to sheets. It is a misconception that zinc cannot be beaten to sheets.

3. How would you show that metals react with acid to liberate hydrogen?

Ans: Metals generally, react with dilute acids to form salts and release hydrogen gas.

Testing presence of Hydrogen gas : Bring a lighted matchstick with flame near the mouth of the test tube in which reaction takes place. The gas coming out burns producing a pop sound. This shows that gas produced in the reaction is hydrogen.

4. How do we protect iron from corrosion?

Ans. We protect iron from corrosion by forming a protective layer of zinc or nickel over it. Iron objects are coated with zinc by dipping the iron objects in molten zinc. This is called galvanizing.

5. What are the various uses of mercury?

Ans: Mercury, a liquid metal is a good conductor of heat with uniform expansion in volume with the rise in every degree of temperature. It is used in thermometers and for coating one side of a sheet of glass to turn it into a mirror.

Mercury are also used in fluorescent tube, making alloy like Silver Amalgam.

6. What do you understand by reactivity of metals? Explain giving one example.

Ans: Different metal react differently with oxygen, water, acid, bases and salt. This is called chemical reactivity. For example, if we put a piece of sodium and zinc in water, sodium react more vigorously than zinc.

7. Name two metals which are both malleable and ductile.

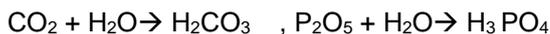
Ans. Copper, Aluminium

8. What is the advantage of adding copper base to a stainless-steel utensil?

Ans: Copper has a better and uniform conductivity of heat than stainless steel hence stainless steel utensils are generally provided with a copper base.

9. Name an oxide which may be dissolved in water to obtain acidic solution.

Ans: Oxide of non-metals like carbon, sulphur, phosphorous etc. when dissolve in water form acid.



10. Give the nature (acidic or basic) of (i) magnesium oxide and (ii) sulphur dioxide?

Ans: (i) magnesium oxide- Basic oxide and (ii) sulphur dioxide- Acidic oxide

11. What is the similarity and difference between a base and an alkali?

Alkali is a strong base that easily dissolves in water in comparison to a weak base. Not all bases are alkali but all alkali are bases.

12. What is the use of metalloids?

Ans: Metalloids and their compounds are used as semiconductors in electronics. One major use is in LED lamps and other electronics.

Silicon used in computer chips. Arsenic used in LED. Boron used in firework and as boric acid in cleaning agents.

B. Long answer type questions.

1. What may happen when: (a) Sodium is dropped on water?

Ans: A piece of sodium when dropped on water it reacts with water vigorously and form sodium hydroxide and release hydrogen gas. Hydrogen gas stick to the surface of sodium keeps the sodium jumping over the surface of water till whole of it is consumed in the reaction. $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$

(b) A copper nail is placed in the solution of iron sulphate? Ans: No change occur as copper is less reactive than Iron

(c) Zinc pieces are added to hydrochloric acid?

Ans: when Zinc pieces are added to hydrochloric acid we observe bubbles of hydrogen gas observed



(d) Sulphur dioxide gas is dissolved in water?

Ans: if Sulphur dioxide gas is dissolved in water it forms sulphuric acid which turn blue litmus solution red.

(e) Magnesium oxide is dissolved in water? Ans: when magnesium oxide is dissolved in water it will form magnesium hydroxide which is basic in nature and turn red litmus blue.

(f) A iron nail is placed in the solution of copper sulphate?

Ans: iron from the nails displaces copper from the copper sulphate solution, thus turning blue copper sulphate solution into a greenish black iron sulphate solution. Thus, iron from the nails has gone into the solution replacing copper and in turn, copper from the solution gets deposited on the iron nails. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$

2. What is the effect of oxygen and moisture on raw iron?

Ans: when raw Iron come in contact of moist air it form layer of iron oxide called rust. Rust gradually eats up iron objects called corrosion of iron.

3. What do you understand by activity of metals? Which one of the known metals is most reactive and which one is the least reactive?

Ans: The activity series of metals is a list of metals arranged in decreasing order of reactivity to displace hydrogen gas from water and acid solutions. It can also be used to predict which metals will displace other metal in aqueous solutions. Potassium is at the top of the series and hence most reactive and platinum is least reactive.

4. What is corrosion? How do we protect metals from being corroded?

Ans : Rusting of iron gradually eats up metals and damage objects made up of iron at home and industry. Corrosion of copper is less damaging and it remains on the surface only. Corrosion of silver is simply a blackening of silver on surface.

We protect metal from being corroded by making a protective layer of paint, zinc or nickel. The process of making layer of zinc is called Galvanization. The process of make layer of nickel using electric current is called electroplating.

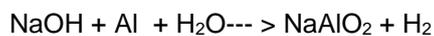
Raw iron are also painted with water proof paints to protect them from moisture so that they do not corrode.

5. State whether the solution formed by the reaction of sodium with water is acidic or basic? How to test it?

Ans: Sodium reacts vigorously with water at room temperature (cold water) forming sodium hydroxide, releasing hydrogen gas. $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$. Sodium hydroxide is basic because it turn red litmus into blue.

Thinking Skills : 1. What does a 'pop' sound indicate when aluminium strips are placed and heated in a test tube containing sodium hydroxide (NaOH) solution and a burning matchstick is brought at the mouth of the test tube? Also, try naming the salt left in solution in the test tube after the reaction is complete.

Ans: A 'pop' sound indicate release of Hydrogen gas . Sodium aluminate salt formed after the reaction.



2. You are given two oxides A and B. One of the two is a basic oxide and the other one is an acidic oxide. How would you identify their chemical nature?

Ans: Put Blue litmus into aqueous solution of A and B. if colour change to red it is acidic.

3. You are given finely powdered blue material in a glass bottle and the bottle is not labelled. How to find out if it is powdered blue vitriol or a blue dye?

Ans: Blue vitriol is blue in colour as it contains 5 molecules of water of crystallisation ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). When it is heated, it losses water of crystallisation and becomes anhydrous (CuSO_4) which is grey-white in colour.

4. Place the solution of a salt and pieces of metal in each beaker as follows and record your observations regarding displacement reaction taking place in each, giving reason: (NCERT Based)

(a) Zinc (Zn) granules are placed in the solution of copper sulphate (CuSO_4) ---- Yes

(b) Soft iron nails (Fe) are placed in the solution of copper sulphate (CuSO_4) -- Yes

(c) Copper turnings (Cu) are placed in the solution of zinc sulphate (ZnSO_4) ---- No

(d) Copper turnings (Cu) are placed in the solution of iron sulphate (FeSO_4) --- No

(e) Soft iron nails (Fe) are placed in the solution of zinc sulphate (ZnSO_4) --- No