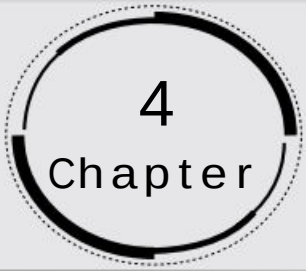
Materials: Metals and Non - Metals



1. Which of the following can be beaten into thin sheets?

(a) Zinc (b) Phosphorus (c) Sulphur (d) Oxygen.

Ans: (a) Zinc. It can be beaten into thin sheets.

2. Which of the following statements is correct?

(a) All metals are ductile.

(b) All non-metals are ductile.

(c) Generally, metals are ductile.

(d) Some non-metals are ductile.

Ans: (c) Generally, metals are ductile. Mercury, on the other hand, is a liquid metal that cannot be formed into thin wires and is not ductile at normal temperature.

3. Fill in the blanks in the following statements.

(a) Phosphorus is a very_____non-metal.

Ans: Phosphorus is a very reactive non-metal.

(b) Metals are_____conductors of heat and_____.

Ans: Metals are good conductors of heat and electricity.

(c) Iron is_____reactive than copper.

Ans: Iron is more reactive than copper.

(d) Metals react with acids to produce_____gas.

Ans: Metals react with acids to produce hydrogen gas.

4. Mark 'T' if the statement is true and 'F' if it is false.

(i) Generally, non-metals react with acids. ( )

Ans: Generally, non-metals react with acids. (F)

(ii) Sodium is a very reactive metal. ( )

Ans: Sodium is a very reactive metal. (T)

(iii) Copper displaces zinc from zinc sulphate solution. ( )

Ans: Copper displaces zinc from zinc sulphate solution. (F)

(iv) Coal can be drawn into wires. ( )

Ans: Coal can be drawn into wires. (F)

5. Some properties are listed in the following Table. Distinguish between metals and nonmetals on the basis of these properties.

Properties	Metals	Non-metals
Malleability		
Ductility		
Appearance		
Hardness		
Conduction of Electricity		
Heat Conduction		

Ans:

Properties	Metals	Non-metals
Malleability	Can be beaten into thin sheets	Cannot be beaten into thin sheets
Ductility	Can be drawn into thin wires	Cannot be drawn into thin wires
Appearance	Lustrous	Dull
Hardness	Hard	Soft
Conduction of Electricity	Good conductors of electricity	Poor conductors of electricity
Heat Conduction	Good conductors of heat	Poor conductors of heat

6. Give reasons for the following.

(a) Aluminium foils are used to wrap food items.

Ans: Food is wrapped in aluminium foil because the metal can be drawn into thin sheets (malleable).

(b) Immersion rods for heating liquids are made up of metallic substances.

Ans: Metal immersion rods are used to heat liquids because metals are excellent heat and electrical conductors.

(c) Copper cannot displace zinc from its salt solution.

Ans: Because Copper is less reactive than Zinc, it cannot displace Zinc from its salt solution. Metal reactivity series can help you understand this better.

$Cu(s) + ZnSO_4\ (aq) \rightarrow$ No reaction

(d) Sodium and potassium are stored in kerosene.

Ans: Because sodium and potassium are very reactive with oxygen in the atmosphere, they are kept in kerosene.

7. Can you store lemon pickle in an aluminium utensil? Explain.

Ans: Lemon pickle includes acids, thus it cannot be preserved in aluminium utensils.

Acids react with aluminium, releasing hydrogen, causing the pickle to spoil.

8. Match the substances given in Column A with their uses given in Column B.

A		**B**	
(i)	Gold	(a)	Thermometers
(ii)	Iron	(b)	Electric wire
(iii)	Aluminium	(c)	Wrapping food
(iv)	Carbon	(d)	Jewellery
(v)	Copper	(e)	Machinery
(vi)	Mercury	(f)	Fuel

Ans:

A		B	
(i)	Gold	(d)	Jewellery
(ii)	Iron	(e)	Machinery
(iii)	Aluminium	(c)	Wrapping food
(iv)	Carbon	(f)	Fuel
(v)	Copper	(b)	Electric wire
(vi)	Mercury	(a)	Thermometers

9. What happens when

(a) Dilute sulphuric acid is poured on a copper plate?

Write word equations of the reactions involved.

Ans: When dilute sulphuric acid is poured on a copper plate, the copper metal reacts with the sulphuric acid, releasing hydrogen gas.

Copper(Cu) + Sulphuric acid(H_2SO_4) ------ > Copper sulphate($CuSO_4$) + Hydrogen gas(H_2)

(b) Iron nails are placed in copper sulphate solution?

Write word equations of the reactions involved.

Ans: When a copper sulphate solution is used to soak an iron nail. Copper is displaced by iron in a copper sulphate solution, resulting in copper and iron sulphate. Copper is less reactive than iron.

Iron(Fe) + Copper sulphate($CuSO_4$) -------> Iron sulphate($FeSO_4$) + Copper(Cu)

10. Saloni took a piece of burning charcoal and collected the gas evolved in a test tube.

(a) How will she find the nature of the gas?

Ans: When a few drops of water are added to a gas-filled test tube. In water, gas is dissolved. Use blue litmus to test the gas and water solution. The blue litmus changes colour to red, indicating that the gas is acidic.

(b) Write down word equations of all the reactions taking place in this process.

Ans: Charcoal releases CO_2 when it is burnt. CO_2 a greenhouse gas.

C + O_2 -------> CO_2

(Carbon from charcoal) (Oxygen) (Carbon Dioxide)

Carbonic acid is formed when carbon dioxide gas combines with water, turning blue litmus red.

CO_2 + H_2O -------> H_2CO_3

(Carbon Dioxide) (Water) (Carbonic acid)
(Turns blue litmus red)

11. One day Reeta went to a jeweler's shop with her mother. Her mother gave an old gold jewelry to the goldsmith to polish. Next day when they brought the jewelry back, they found that there was a slight loss in its weight. Can you suggest a reason for the loss in weight?

Ans: The ancient gold jewellery is soaked in a solution called Aqua Regia to polish it (1:3 molar ratio of HNO_3 and HCl). Aqua Regia dissolves the outer layer of the golden jewellery. The removal of the outer layer reduces the weight of gold jewellery.