

# Chapter 3 – Metals and Non-metals

## In-text Questions and Exercise Answers

### Answers to In-text Questions

#### Question 1.

Give examples of metals which—

**(i) Are liquid at room temperature**

**Answer:**

Mercury

**(ii) Can be cut easily with a knife**

**Answer:**

Sodium

**(iii) Are the best conductors of heat**

**Answer:**

Silver

**(iv) Are poor conductors of heat**

**Answer:**

Lead

#### Question 2.

Define malleable and ductile.

**Answer:**

- **Malleable:** Metals that can be beaten into thin sheets.
- **Ductile:** Metals that can be drawn into wires.

#### Question 3.

Why is sodium kept immersed in kerosene?

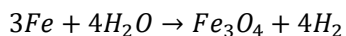
**Answer:**

Sodium is highly reactive with air and water and may catch fire. Therefore, it is stored in kerosene.

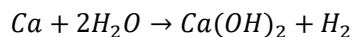
#### Question 4.

Write equations for the following reactions.

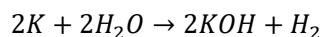
**(i) Iron with steam**



**(ii) Calcium with water**



**(iii) Potassium with water**



**Question 5.**

Questions based on metals A, B, C, and D

**(i) Which is the most reactive metal?**

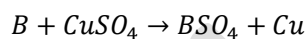
**Answer:**

Metal B

**(ii) What happens when metal B is added to copper sulphate solution?**

**Answer:**

Metal B displaces copper from copper sulphate solution.



**(iii) Arrange A, B, C, and D in decreasing order of reactivity.**

**Answer:**

B > A > C > D

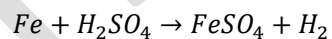
**Question 6.**

Which gas is evolved when a reactive metal is added to dilute HCl?

**Answer:**

Hydrogen gas is evolved.

**Reaction of iron with dilute H<sub>2</sub>SO<sub>4</sub>**

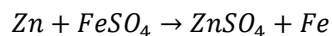


**Question 7.**

What happens when zinc is added to iron(II) sulphate solution?

**Answer:**

Zinc displaces iron from iron sulphate solution.



**Question 8.**

(i) Write the electron-dot structures for sodium, oxygen, and magnesium.

**Answer:**

- Sodium (Na) → 2,8,1
- Oxygen (O) → 2,6
- Magnesium (Mg) → 2,8,2

**Question 9.**

(ii) Show the formation of  $\text{Na}_2\text{O}$  and  $\text{MgO}$  by transfer of electrons.

**Answer:**

- Sodium loses 1 electron.
- Magnesium loses 2 electrons.
- Oxygen gains 2 electrons.

**Question 10.**

(iii) Which ions are present in these compounds?

**Answer:**

- $\text{Na}_2\text{O} \rightarrow \text{Na}^+$  and  $\text{O}^{2-}$
- $\text{MgO} \rightarrow \text{Mg}^{2+}$  and  $\text{O}^{2-}$

**Question 11.**

Why do ionic compounds have high melting points?

**Answer:**

Because strong electrostatic forces exist between the ions.

**Question 12.**

Define the following terms.

**(i) Mineral**

Naturally occurring elements or compounds found in the earth's crust.

**(ii) Ore**

Minerals from which metals can be extracted profitably.

**(iii) Gangue**

Impurities present in ores.

**Question 13.**

Name two metals found in free state in nature.

**Answer:**

- Gold
- Platinum

**Question 14.**

Which chemical process is used to obtain a metal from its oxide?

**Answer:**

Reduction

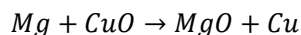
**Question 15.**

Under what condition will displacement reaction occur?

**Answer:**

When a more reactive metal displaces a less reactive metal from its oxide.

**Example**



**Question 16.**

Which metal does not corrode easily?

**Answer:**

Gold

**Question 17.**

What are alloys?

**Answer:**

Homogeneous mixtures of two or more metals or a metal and a non-metal are called alloys.

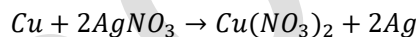
**Exercise Answers**

**Question 1.**

Which pair will show displacement reaction?

**Answer:**

(d)  $AgNO_3$  solution and copper metal



**Question 2.**

Which method is suitable to prevent rusting of an iron frying pan?

**Answer:**

(d) All of these

**Question 3.**

A metal reacts with oxygen to form a high melting compound soluble in water. Which element could it be?

**Answer:**

(a) Calcium

**Question 4.**

Why are food cans coated with tin instead of zinc?

**Answer:**

(c) Zinc is more reactive than tin.

**Question 5.**

Differentiate between metals and non-metals.

(a)

- Metals do not break when hammered.
- Non-metals break easily.
- Metals conduct electricity in battery-bulb test.

**(b)**

These tests are useful for identifying metals and non-metals.

**Question 6.**

What are amphoteric oxides? Give two examples.

**Answer:**

Oxides that react with both acids and bases are called amphoteric oxides.

**Examples:**

- $\text{Al}_2\text{O}_3$
- $\text{ZnO}$

**Question 7.**

Name two metals that displace hydrogen from dilute acids and two that do not.

**Answer:**

**Metals that displace hydrogen:**

- Zinc
- Iron

**Metals that do not:**

- Gold
- Silver

**Question 8.**

In electrolytic refining of a metal M, what would you use as anode, cathode, and electrolyte?

**Answer:**

- Impure metal → Anode
- Pure metal → Cathode
- Solution of metal salt → Electrolyte

**Question 9.**

Sulphur powder is heated and the gas evolved is collected.

**(a)(i) Action on dry litmus paper**

**Answer:**

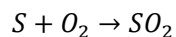
No effect.

**(ii) Action on moist litmus paper**

**Answer:**

Blue litmus turns red.

**(b) Balanced chemical equation**



**Question 10.**

Write two methods to prevent rusting of iron.

**Answer:**

1. Painting
2. Galvanization

**Question 11.**

What type of oxides are formed by non-metals with oxygen?

**Answer:**

Acidic oxides

**Question 12.**

Give reasons.

**(a)**

Platinum, gold, and silver are used for making jewellery because they are less reactive and lustrous.

**(b)**

Sodium, potassium, and lithium are stored under oil because they are highly reactive.

**(c)**

Aluminium is highly reactive, yet it is used for making cooking utensils because a protective oxide layer forms on its surface.

**(d)**

Carbonate and sulphide ores are converted into oxides because metals are easier to extract from oxides.

**Question 13.**

Why are lemon or tamarind effective in cleaning copper vessels?

**Answer:**

They contain acids that remove copper oxide from the vessel surface.

**Question 14.**

Differentiate between metals and non-metals on the basis of chemical properties.

<b>Metals</b>	<b>Non-metals</b>
React with acids to produce H <sub>2</sub> gas	Do not produce H <sub>2</sub> gas
Form basic oxides	Form acidic oxides

**Question 15.**

What was the nature of the solution used for cleaning gold ornaments?

**Answer:**

The solution was probably acidic in nature, such as aqua regia.

**Question 16.**

Why is copper used for making hot water tanks but not steel?

**Answer:**

Copper does not react with water or steam, whereas iron gets corroded.