

Metals, Non-metals and Carbon Compounds

Science · Class 10 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ____ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Study every diagram and table carefully.

Section A — Scientific Reasoning

Q1–Q8 · 1 mark each

1. Which metal is the best conductor of electricity?

- (A) Lead (B) Iron
(C) Silver (D) Mercury

2. Which non-metal conducts electricity?

- (A) Sulphur (B) Graphite
(C) Phosphorus (D) Iodine

3. Which of these metals is the most reactive?

- (A) Magnesium (B) Calcium
(C) Potassium (D) Zinc

4. The metal that is a liquid at room temperature is _____.

- (A) Sodium (B) Tin
(C) Aluminium (D) Mercury

5. Ionic compounds generally have _____.

- (A) High melting and boiling points (B) Low melting and boiling points
(C) No melting point (D) The ability to conduct in the solid state

6. Carbon forms a very large number of compounds mainly because it is _____.

- (A) A metal (B) Tetravalent and can catenate
(C) Highly reactive with water (D) Able to form ionic bonds easily

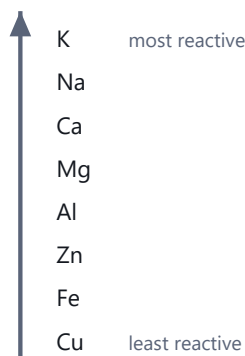
7. Two consecutive members of a homologous series differ by _____.

- (A) C_2H_2 (B) CH_3
(C) CH_2 (D) H_2O

8. The chemical formula of ethanol is _____.

- (A) CH_3OH (B) C_2H_6
(C) CH_3COOH (D) C_2H_5OH

9. Galvanisation protects iron from rusting by coating it with a layer of _____.
 (A) Zinc (B) Copper
 (C) Tin (D) Paint
10. Using the reactivity series shown, which reaction will take place?



Part of the reactivity series of metals

- (A) $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$ (B) $\text{Cu} + \text{ZnSO}_4 \rightarrow \text{CuSO}_4 + \text{Zn}$
 (C) $\text{Fe} + \text{MgSO}_4 \rightarrow \text{FeSO}_4 + \text{Mg}$ (D) $\text{Cu} + \text{FeSO}_4 \rightarrow \text{CuSO}_4 + \text{Fe}$
11. Brass is an alloy of _____.
 (A) Copper and tin (B) Copper and zinc
 (C) Iron and carbon (D) Aluminium and copper
12. One row of the table below is **incorrectly** matched. Which row is it?

Row	Substance	Description
(A)	Diamond	Hardest natural substance, a form of carbon
(B)	Graphite	Soft and slippery, used as a lubricant
(C)	Sodium	Stored under kerosene because it reacts with air and water
(D)	Gold	Highly reactive metal that tarnishes rapidly

Table 2.1 — Substances and their descriptions

- (A) (A) (B) (B)
 (C) (C) (D) (D)
13. Soap is manufactured by heating a fat or oil with sodium hydroxide. This reaction is called _____.
 (A) Esterification (B) Hydrogenation
 (C) Saponification (D) Neutralisation
14. The number of structural isomers of butane (C_4H_{10}) is _____.
 (A) 1 (B) 2
 (C) 3 (D) 4
15. When ethanol is warmed with acetic acid in the presence of a little concentrated sulphuric acid, the product has a sweet fruity smell. That product is _____.
 (A) An alcohol (B) A soap
 (C) An alkane (D) An ester

- 16. Assertion (A):** Aluminium articles keep their shine for years even though aluminium is a fairly reactive metal.
Reason (R): A thin, tightly bound layer of aluminium oxide forms on the surface and protects the metal beneath.
- (A) Both A and R are true and R is the correct explanation of A
(B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false
(D) A is false but R is true
- 17.** A shiny element X conducts electricity, is beaten into thin sheets, and reacts with dilute hydrochloric acid to release a gas that burns with a pop sound. X is most likely _____.
(A) A metal such as zinc
(B) A non-metal such as sulphur
(C) A noble gas
(D) A metalloid that does not react with acids
- 18.** Which statement about ethene (C_2H_4) is correct?
(A) It is saturated and contains only single bonds
(B) It is unsaturated and contains a double bond between the two carbon atoms
(C) It contains a triple bond between the two carbon atoms
(D) It is an alcohol

Answer Key

1	C	2	B	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	A
11	B	12	D	13	C	14	B	15	D
16	A	17	A	18	B				

Solutions

1. Answer: (C) Silver

Silver conducts electricity better than any other metal, with copper close behind. Copper and aluminium are used in wiring instead only because silver is far too costly.

2. Answer: (B) Graphite

Graphite, a form of carbon, conducts because each of its atoms bonds to only three others, leaving one free electron per atom to carry current. It is the well-known exception among non-metals.

3. Answer: (C) Potassium

In the reactivity series **potassium** stands at the top — it reacts violently even with cold water. Reactivity falls as one moves down the series through calcium, magnesium and zinc.

4. Answer: (D) Mercury

Mercury is the only metal that is liquid at ordinary room temperature, which is why it was used in thermometers and barometers.

5. Answer: (A) High melting and boiling points

The oppositely charged ions in the lattice attract each other strongly, so a great deal of energy is needed to break it apart. Hence ionic compounds have **high melting and boiling points**, and they conduct only when molten or dissolved, not as solids.

6. Answer: (B) Tetravalent and can catenate

Carbon has four valence electrons, so it forms four covalent bonds, and it can link to other carbon atoms in long chains and rings — the property called catenation. Being **tetravalent and able to catenate** is what gives carbon its millions of compounds.

7. Answer: (C) CH₂

Each step up a homologous series adds one **CH₂** unit, raising the molecular mass by 14 u. That is why members of a series show a steady gradation in physical properties but similar chemical behaviour.

8. Answer: (D) C₂H₅OH

Ethanol has two carbon atoms and an alcohol group: **C₂H₅OH**. CH₃OH is methanol, CH₃COOH is acetic acid and C₂H₆ is ethane.

9. Answer: (A) Zinc

Galvanisation coats iron with **zinc**. Zinc is more reactive than iron, so it corrodes first and shields the iron beneath even if the coating is scratched.

10. Answer: (A) $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$

A metal can displace only a *less* reactive metal from its salt solution. Zinc stands above iron in the series, so **Zn + FeSO₄ → ZnSO₄ + Fe** does take place. The other three ask a lower metal to displace a higher one, which cannot happen.

11. Answer: (B) Copper and zinc

Brass is made of **copper and zinc**. Bronze is copper with tin, and steel is iron with a little carbon.

12. Answer: (D) (D)

Gold sits near the bottom of the reactivity series and stays bright for centuries, which is exactly why it is used in jewellery and coins. So row **(D)** is wrong; the other three descriptions are correct.

13. Answer: (C) Saponification

Saponification is the alkaline hydrolysis of a fat or an oil, giving soap and glycerol. Esterification is the reverse kind of change, making an ester from an acid and an alcohol.

14. Answer: (B) 2

Four carbon atoms can be arranged either in a straight chain (n-butane) or with a branch (isobutane), so butane has **2** structural isomers. Chains of three carbons or fewer allow only one arrangement.

15. Answer: (D) An ester

An acid reacting with an alcohol gives **an ester**, in this case ethyl acetate, together with water. Esters are responsible for the pleasant smells of many fruits and are used in perfumes.

16. Answer: (A) Both A and R are true and R is the correct explanation of A

Aluminium reacts at once with the oxygen of the air, but the oxide film it forms sticks firmly and seals the surface, so no further attack occurs. Both statements are true and the protective film is exactly **why** the shine lasts, so R explains A.

17. Answer: (A) A metal such as zinc

Lustre, conductivity and malleability all point to a metal, and the gas that burns with a pop is hydrogen, released when a reactive metal displaces it from an acid. So X is **a metal such as zinc**. Non-metals do not displace hydrogen from acids in this way.

18. Answer: (B) It is unsaturated and contains a double bond between the two carbon atoms

With only four hydrogen atoms for two carbons, the carbons cannot each reach four bonds using single bonds alone, so they share two pairs of electrons. Ethene is therefore **unsaturated, with a carbon-carbon double bond**. A triple bond would give ethyne, C_2H_2 .