

Chemical Reactions, Acids, Bases and Salts

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

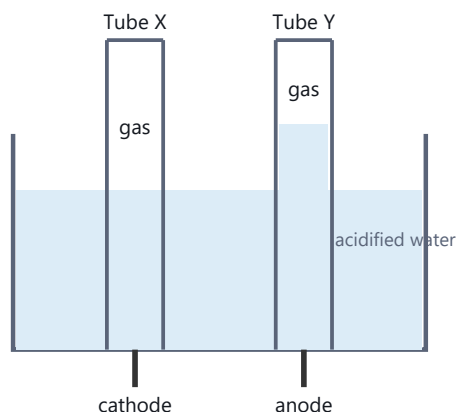
- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking.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

Section A — Scientific Reasoning

Q1–Q8 · 1 mark each

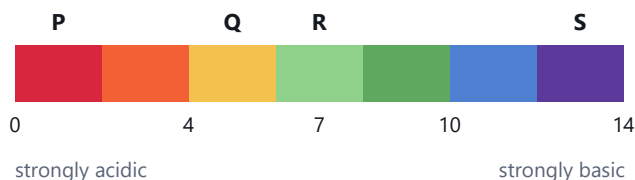
- A chemical equation is balanced in order to satisfy the law of _____.
 (A) Conservation of energy (B) Constant proportions
 (C) Conservation of mass (D) Multiple proportions
- The reaction $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ is an example of a _____ reaction.
 (A) Combination (B) Double displacement
 (C) Displacement (D) Decomposition
- An acid turns blue litmus paper _____.
 (A) Blue (B) Green
 (C) Red (D) Colourless
- The pH of a neutral solution such as pure water is _____.
 (A) 0 (B) 7
 (C) 10 (D) 14
- The chemical formula of baking soda is _____.
 (A) NaCl (B) NaOH
 (C) Na_2CO_3 (D) NaHCO_3
- The reaction between an acid and a base to give a salt and water is called _____.
 (A) Neutralisation (B) Oxidation
 (C) Reduction (D) Corrosion
- In a chemical reaction, a substance that **gains** oxygen is said to be _____.
 (A) Reduced (B) Neutralised
 (C) Oxidised (D) Precipitated
- The rusting of iron is an example of _____.
 (A) Neutralisation (B) Rancidity
 (C) Sublimation (D) Corrosion

9. In the electrolysis of water shown, twice as much gas collects in one tube as in the other. The gas in the larger volume is _____.



Electrolysis of acidified water, with gases collected in two tubes

- (A) Hydrogen, collected at the cathode
(B) Oxygen, collected at the anode
(C) Carbon dioxide, collected at the cathode
(D) Nitrogen, collected at the anode
10. Which of the following is a **displacement** reaction?
- (A) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
(B) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
(C) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
(D) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
11. On the pH scale shown, which labelled position would lemon juice occupy?



The pH scale from 0 to 14 with four positions marked

- (A) P
(B) Q
(C) R
(D) S
12. A person suffering from acidity is given an antacid such as milk of magnesia. It works because it _____.
- (A) Increases the acid in the stomach
(B) Neutralises the excess acid in the stomach
(C) Coats the stomach with acid
(D) Kills the bacteria in the stomach

13. One row of the table below is **incorrectly** matched. Which row is it?

Row	Common name	Chemical formula
(A)	Washing soda	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
(B)	Plaster of Paris	NaCl
(C)	Bleaching powder	CaOCl_2
(D)	Caustic soda	NaOH

Table 1.1 — Common names and chemical formulae

- (A) (A) (B) (B)
(C) (C) (D) (D)

14. When quicklime is added to water, the mixture becomes hot. This shows that the reaction is _____.

- (A) Endothermic (B) A displacement reaction
(C) Exothermic (D) A decomposition reaction

15. Which salt is used to remove the permanent hardness of water?

- (A) Bleaching powder (B) Common salt
(C) Baking soda (D) Washing soda

Achievers Section

Q16–Q18 · 3 marks each

16. **Assertion (A):** Rainwater with a pH below about 5.6 is called acid rain and can damage buildings and aquatic life.

Reason (R): Oxides of sulphur and nitrogen released by burning fossil fuels dissolve in rainwater to form acids.

- (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. In the reaction $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$, which statement is correct?

- (A) Zinc is oxidised and hydrogen is reduced (B) Zinc is reduced and hydrogen is oxidised
(C) Both zinc and hydrogen are oxidised (D) It is a double displacement reaction

18. A student mixes solutions of barium chloride and sodium sulphate and observes a white precipitate. The reaction is best described as _____.

- (A) A combination reaction (B) A double displacement (precipitation) reaction
(C) A decomposition reaction (D) An oxidation reaction

Answer Key

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

Solutions

1. Answer: (C) Conservation of mass

Atoms are only rearranged in a reaction, never created or destroyed, so the same number of atoms of each element must appear on both sides. Balancing an equation is exactly what expresses the law of **conservation of mass**.

2. Answer: (D) Decomposition

A single compound breaks up into two simpler substances, which makes it a **decomposition** reaction. Since it needs electricity, it is more precisely an electrolytic decomposition.

3. Answer: (C) Red

Acids turn blue litmus **red**, while bases turn red litmus blue. Litmus is the commonest natural indicator for telling the two apart.

4. Answer: (B) 7

The pH scale runs from 0 to 14, and **7** marks neutrality. Values below 7 are acidic and above 7 basic.

5. Answer: (D) NaHCO₃

Baking soda is sodium hydrogencarbonate, **NaHCO₃**. NaCl is common salt, Na₂CO₃ washing soda and NaOH caustic soda.

6. Answer: (A) Neutralisation

Acid + base → salt + water is a **neutralisation** reaction, and it releases heat. It explains why an antacid relieves acidity in the stomach.

7. Answer: (C) Oxidised

Gaining oxygen (or losing hydrogen) is **oxidation**. The substance that supplies the oxygen is itself reduced, so the two changes always happen together in a redox reaction.

8. Answer: (D) Corrosion

Iron slowly reacts with the oxygen and moisture of the air to form hydrated iron oxide, eating away the metal. This gradual attack on a metal surface is **corrosion**. Rancidity is the spoiling of fats and oils instead.

9. Answer: (A) Hydrogen, collected at the cathode

Water is H₂O, so electrolysis releases hydrogen and oxygen in a 2 : 1 ratio by volume. The larger volume is therefore **hydrogen, and it collects at the cathode**, the negative electrode. Tube X in the figure holds twice as much gas as tube Y.

10. Answer: (A) Fe + CuSO₄ → FeSO₄ + Cu

Iron is more reactive than copper, so it pushes copper out of its salt solution: **Fe + CuSO₄ → FeSO₄ + Cu**. The others are, in order, combination, decomposition and neutralisation reactions.

11. Answer: (B) Q

Lemon juice contains citric acid and has a pH of about 2 to 3, so it is acidic but not as strongly acidic as a mineral acid. Position **Q**, in the low-pH region below 7, fits it. R marks neutrality and S the strongly basic end.

12. Answer: (B) Neutralises the excess acid in the stomach

Milk of magnesia is magnesium hydroxide, a mild base, so it **neutralises the excess hydrochloric acid** in the stomach and raises the pH towards normal. A strong base would itself be harmful.

13. Answer: (B) (B)

Plaster of Paris is calcium sulphate hemihydrate, CaSO₄ · $\frac{1}{2}$ H₂O; NaCl is common salt. So row **(B)** is wrong, while the other three pairings are correct.

14. Answer: (C) Exothermic

The temperature rises because the reaction releases heat to the surroundings, which makes it **exothermic**. Quicklime and water combine to give slaked lime: CaO + H₂O → Ca(OH)₂.

15. Answer: (D) Washing soda

Washing soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) precipitates the calcium and magnesium salts that make water hard, so the water lathers freely with soap. Baking soda is used in cooking and bleaching powder for disinfecting.

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

Even clean rain is slightly acidic because it dissolves carbon dioxide, but the oxides of sulphur and nitrogen from burning fuels form much stronger acids and push the pH lower. Both statements are true, and the second is exactly **why** acid rain forms, so R explains A.

17. Answer: (A) Zinc is oxidised and hydrogen is reduced

Zinc loses electrons to become Zn^{2+} , so it is oxidised, while the hydrogen ions gain electrons to become hydrogen gas, so they are reduced. Hence **zinc is oxidised and hydrogen is reduced**. Zinc displacing hydrogen from the acid makes this a displacement, not a double displacement.

18. Answer: (B) A double displacement (precipitation) reaction

The two solutions exchange partners: $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$. Barium sulphate is insoluble, so it separates as a white precipitate, making this a **double displacement reaction**, of the kind also called a precipitation reaction.