

	INDIAN SCHOOL AL WADI AL KABIR	
Class: X	Department: SCIENCE 2026 – 27 SUBJECT: SCIENCE(CHEMISTRY)	Date : 17/04/2026
Worksheet No: 01 WITH ANSWERS	CHAPTER / UNIT: CHEMICAL REACTIONS AND EQUATIONS	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

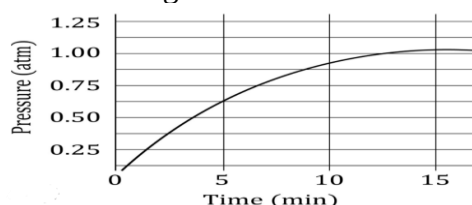
OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

- When ferrous sulphate crystals are heated in a test tube, we observe that
 - A colourless gas with no smell is evolved. (CBSE 2025-26)
 - A brown gas is evolved.
 - The green colour of the salt fades, and a gas with the smell of burning sulphur is evolved.
 - The green colour of the salt fades, and no gas is evolved.
- Electrolysis of water is a decomposition reaction. The ratio (M_H : M_O) of hydrogen and oxygen gases liberated at the electrodes during electrolysis of water is : (CBSE 2024-25)
 - 8:1
 - 2:1
 - 1:2
 - 1:8
- Which of the following is not a thermal decomposition reaction? (CBSE 2023-2024)
 - $2AgCl \rightarrow 2Ag + Cl_2$
 - $2FeSO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$
 - $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$
 - $2Pb(NO_3)_{2(s)} \rightarrow 2PbO_{(s)} + 4NO_{2(g)} + O_{2(g)}$
- To balance the following chemical equation, the values of the coefficients x, y and z are:

$$xZn(NO_3)_{2(s)} \rightarrow yZnO_{(s)} + zNO_{2(g)} + O_{2(g)}$$
 (CBSE 23-24)
 - 4,2,2
 - 4,4,2
 - 2,2,4
 - 2,4,2
- Which of the following is an example of an endothermic process?
 - Formation of slaked lime

- (b) Decomposition of vegetable matter into compost
 (c) Dissolution of ammonium chloride in water
 (d) Digestion of food in our body
6. A student added 10 g of calcium carbonate to a rigid container, secured it tightly and started to heat it. After some time, an increase in pressure was observed. The pressure reading was then noted at intervals of 5 mins and plotted against time, in a graph as shown below. During which time interval did maximum decomposition take place?



- (a) 15–20 min
 (b) 10–15 min
 (c) 5–10 min
 (d) 0–5 min
7. Which of the following reactions is different from the remaining three?(CBSE 2024)
- (a) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
 (b) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
 (c) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{KHSO}_4 + \text{HNO}_3$
 (d) $\text{ZnCl}_2 + \text{H}_2\text{S} \rightarrow \text{ZnS} + 2\text{HCl}$
8. Sodium reacts with water to form sodium hydroxide and hydrogen gas. The balanced equation which represents the above reaction is (CBSE 2022-23)
- (a) $\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + 2\text{H}_2(\text{g})$
 (b) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
 (c) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{NaOH}(\text{aq}) + 2\text{H}_2(\text{g})$
 (d) $2\text{Na}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + 2\text{H}_2(\text{g})$
9. Which of the following statements about the reaction given below are correct?
 $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$ (CBSE2022-23)
- (i) HCl is oxidised to Cl_2 . (ii) MnO_2 is reduced to MnCl_2 .
 (iii) MnCl_2 acts as an oxidising agent. (iv) HCl acts as an oxidising agent.
- (a) (ii), (iii) and (iv)
 (b) (i), (ii) and (iii)
 (c) (i) and (ii) only
 (d) (iii) and (iv) only
10. The gases evolved on heating lead(II) nitrate crystals are:(CBSE2025-26)
- (a) NO and O_2
 (b) N_2 and NO
 (c) NO_2 and H_2
 (d) NO_2 and O_2

ASSERTION-REASONING QUESTIONS

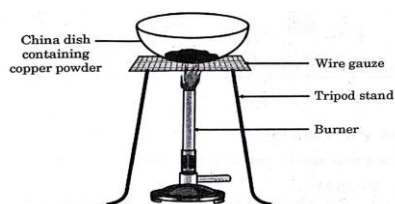
For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i) , (ii), (iii) and (iv)as given below:

- (i)Both A and R are true, and R is the correct explanation of the Assertion.
 (ii)Both A and R are true, but R is not the correct explanation of the Assertion.
 (iii)A is true, but R is false.
 (iv)A is false, but R is true.

11. Assertion (A): In the following reaction, $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$, ZnO undergoes reduction.
Reason (R): Carbon is a reducing agent that reduces ZnO to Zn. (CBSE 2023)
12. Assertion: After white washing the walls, a shiny white finish on the walls is obtained after two to three days.
Reason: Calcium Oxide reacts with Carbon dioxide to form Calcium Hydrogen Carbonate, which gives a shiny white finish.
13. Assertion: - Lead nitrate on thermal decomposition gives lead oxide, brown coloured nitrogen dioxide and oxygen gas.(CBSE 2023)
Reason: - Lead nitrate reacts with potassium iodide to form white ppt of lead iodide, and the reaction is a double displacement as well as a precipitation reaction.
14. Assertion (A): The reaction of quick lime with water is exothermic.
Reason (R): Quicklime reacts vigorously with water, releasing a large amount of heat. (CBSE 2024)
15. Assertion (A): Decomposition reactions are generally endothermic reactions.
Reason (R): Decomposition of organic matter into compost is an exothermic process.

TWO MARKS QUESTIONS

16. Write one chemical equation each for the chemical reaction in which the following have taken place: (i) Change in colour, (ii) Change in temperature, (iii) Formation of precipitate. Mention colour change/temperature change /compound precipitated along with the equation. (CBSE 2024-25)
17. A white salt on heating decomposes to give brown fumes, and a residue is left behind.
(a) Name the salt.
(b) Write the equation for the decomposition reaction.
18. Identify the type of reactions in each of the following reactions:
(i) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
(ii) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
(iii) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
19. A Zinc plate was put into a solution of copper sulphate kept in a glass container. It was found that the blue colour of the solution fades over time. After a few days, when the zinc plate was removed from the solution, several holes were observed on it.
(a) State the reason for the changes observed on the zinc plate.
(b) Write the chemical equation for the reaction involved.
- 20.



Seema took a small amount of copper powder in a china dish and heated it. What changes will she observe on heating? When H_2 gas is passed over this heated substance, what visible changes will be seen in it? Give the chemical equations of the reactions involved, along with the names and colours of the products in each case. (CBSE 2025-26)

THREE MARK QUESTIONS

21. (a) Why do potato chip manufacturers fill the packet of chips with nitrogen gas?
(b) Write one equation each for the decomposition reactions where energy is supplied in the form of (a) heat, (b) light, and (c) electricity

22. When magnesium ribbon is burnt in the air, an ash of white colour is produced. Write the chemical equation for the reaction, giving the chemical name of the ash produced. State the type of chemical reaction justifying your answer. (CBSE 2024)
23. In the electrolysis of water
- (a) Name the gases liberated at the anode and cathode.
 - (b) Why is it that the volume of gas collected on one electrode is two times that on the other electrode?
 - (c) What would happen if dil. H_2SO_4 is not added to water? (CBSE 2020)
24. 2 g of ferrous sulphate crystals are heated in a dry boiling tube. (CBSE 2023,2024)
- (a) List any two observations.
 - (b) Name the type of chemical reaction taking place.
 - (c) Write a balanced chemical equation for the reaction and name the products formed.

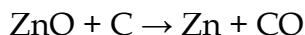
FIVE MARK QUESTIONS

25. An aqueous solution of metal nitrate P reacts with sodium bromide solution to form a yellow precipitate of compound Q, which is used in photography. Q on exposure to sunlight undergoes a decomposition reaction to give the metal present in P and a reddish-brown gas. Identify P and Q. Write a chemical equation and the type of chemical reaction. (CBSE 2023-24)
26. (a) State the various characteristics of chemical reactions.
- (b) State one characteristic of each of the chemical reaction which takes place when:
- (i) Dilute hydrochloric acid is added to sodium carbonate.
 - (ii) Dilute sulphuric acid is added to the barium chloride solution.
 - (iii) Quick lime is treated with water.
27. Identify the type of reactions taking place in each of the following:
- (a) Barium chloride solution is mixed with copper sulphate solution, and white ppt is formed.
 - (b) On heating copper powder in a China dish, the surface of the copper turns black.
 - (c) On heating green coloured ferrous sulphate crystals, a reddish brown solid is left, and the smell of a gas having the odour of burning sulphur is experienced.
 - (d) Iron nails, when left dipped in blue coloured copper sulphate solution, become reddish brown in colour, and the blue colour of the solution fades away.
 - (e) Quick lime reacts vigorously with water, releasing a large amount of heat.

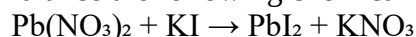
PREVIOUS YEAR BOARD QUESTIONS

28. When the powder of a common metal is heated in an open china dish, its colour turns black. However, when hydrogen is passed over the hot black substance so formed, it regains its original colour. Based on the above information, answer the following questions.
- (a) What type of chemical reaction takes place in each of the two given steps?
 - (b) Name the metal initially taken in powder form. Write balanced chemical equations for both reactions.
29. Silver chloride kept in a China dish turns grey in sunlight.
- (a) Write the colour of silver chloride when it was kept in the China dish.
 - (b) Name the type of chemical reaction taking place and write the chemical equation for the reaction.
 - (c) State one use of the reaction. Name one more chemical which can be used for the same purpose.
30. What is observed after about 1 hour of adding the strips of copper and aluminium separately to the ferrous sulphate solution filled in two beakers? Name the reaction if any change in colour is noticed. Also, write a chemical equation for the reaction.

31. (a) Name the substance oxidised and reduced in the following reaction:



(b) Balance the following chemical reaction:



(c) Give one example each of electrolytic decomposition and decomposition by sunlight.

CASE STUDY BASED QUESTIONS

32. A chemistry teacher demonstrated an experiment where she heated ferrous sulphate crystals in a test tube. The green crystals changed colour, and a brownish solid formed along with the release of two pungent-smelling gases.

(a) Write the balanced chemical equation for the reaction.

(b) Name the type of reaction taking place and explain why it is categorised as such.

(c) What are the names of the gases released?

OR

(c) Give one industrial application of decomposition reactions.

ANSWERS

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

Qno.	Answers
1	(c)The green colour of the salt fades, and a gas with the smell of burning sulphur is evolved.
2	(d)1:8
3	(a) $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$
4.	(C) 2,2,4
5	(c)Dissolution of ammonium chloride in water
6	(d) 0–5 min
7	(b) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
8	(b) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
9	(c)(i) and (ii) only
10	(d) NO_2 and O_2
11	(i)Both A and R are true, and R is the correct explanation of the Assertion.
12	(iii)A is true, but R is false.
13	(iii)A is true, but R is false.
14	(i)Both A and R are true, and R is the correct explanation of the Assertion.
15	(ii)Both A and R are true, but R is not the correct explanation of the Assertion.

16	(i) Change in colour: The solution will become green in colour. $\underset{\text{Blue}}{\text{Fe(s)}} + \underset{\text{Green}}{\text{CuSO}_4\text{(aq)}} \rightarrow \text{FeSO}_4 + \text{Cu(s)}$ (ii) temperature change: The temperature will increase. $\text{NaOH(aq)} + \text{HCl(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O(l)} + \text{Heat}$ (iii) Formation of precipitate: Yellow precipitate of PbI₂ is formed. $\text{Pb(NO}_3)_2\text{(aq)} + 2\text{KI(aq)} \rightarrow \underset{\text{Yellow}}{\text{PbI}_2\text{(s)}} + 2\text{KNO}_3\text{(aq)}$
17	(a) Lead nitrate $2\text{Pb(NO}_3)_2 \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$
18	(i) Displacement reaction (ii) Combination reaction (iii) Decomposition reaction.
19	a) It is because zinc has displaced copper from copper sulphate. Zinc metal has been used to form zinc sulphate; therefore, holes were observed. (b) $\text{Zn} + \underset{\text{Blue}}{\text{CuSO}_4} \rightarrow \underset{\text{colourless}}{\text{ZnSO}_4} + \text{Cu}$
20	1. Heating Copper Powder Observation: The reddish-brown copper powder turns black. Product Name: Copper (II) oxide (Copper oxide). Product Colour: Black. Reaction: $2\text{Cu(s)} + \text{O}_2\text{(g)} \xrightarrow{\text{Heat}} 2\text{CuO(s)}$ 2. Passing Gas over Hot Copper Oxide Observation: The black surface turns reddish-brown as the oxide is reduced, and water droplets may be seen on the cooler parts of the vessel. Product Name: Copper metal and Water. Product Colour: Reddish-brown (Copper). Reaction: $\text{CuO(s)} + \text{H}_2\text{(g)} \xrightarrow{\text{Heat}} \text{Cu(s)} + \text{H}_2\text{O(l)}$
21	(a) To provide an inert atmosphere to prevent chips from getting oxidised. N₂ does not allow chips to get spoiled by oxidation. (b) heat (a) $\text{Heat-CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ light (b) $\text{Light-2AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$ electricity (c) $\text{Electricity-2H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
22	$2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ Magnesium oxide Type – Combination reaction Reason: Two or more reactants combine to form a single product.
23	a) At the anode: Oxygen gas is liberated. At the cathode: Hydrogen gas is liberated.

	(b) The volume of gas collected on one electrode (cathode) is twice that collected on the other electrode (anode), as one molecule of water contains two atoms of hydrogen and one atom of oxygen. $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ (c) Without adding dilute sulphuric acid, water would not conduct electricity effectively, which would hinder the electrolysis process. In addition to a few drops of sulphuric acid, make water a good conductor of electricity.
24	(a) Observations: • Colour changes from green to white • Formation of reddish-brown Ferric oxide (Fe_2O_3)/evolution of SO_2/SO_3 gas. (b) Decomposition reaction $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \rightarrow \text{FeSO}_4 + 7\text{H}_2\text{O}$ (c) $2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$ Ferric oxide Sulphur dioxide Sulphur trioxide
25	$\text{AgNO}_3 + \text{NaBr} \rightarrow \text{AgBr} + \text{NaNO}_3$ (Double displacement reaction) P- AgNO_3 Q- AgBr $2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$ (Photochemical decomposition)
26	(a) change in state change in colour evolution of a gas change in temperature. Formation of precipitate. (b)(i) evolution of gas (ii) Formation of precipitate (iii) Temperature change.
27	(a) Double displacement reaction (b) Oxidation reaction (c) Decomposition reaction (d) Displacement reaction (e) Combination reaction
28	(a) In the first step, oxidation is taking place. In the second step, a redox reaction takes place. (b) Metal in powder form is copper $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$ $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
29	(a) White (b) Photochemical decomposition $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$ (c) Used in black and white photography Silver bromide (AgBr)
30	$\text{Cu(s)} + \text{FeSO}_4\text{(aq)} \rightarrow$ No change will take place Copper is less reactive than Fe, so Cu cannot displace iron from a ferrous sulphate solution. Hence, no reaction will take place. $2\text{Al(s)} + 3\text{FeSO}_4\text{(aq)} \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{Fe(s)}$ (Displacement reaction)

	When Al is added to a $\text{FeSO}_4(\text{aq})$ solution, the green colour of $\text{FeSO}_4(\text{aq})$ disappears, and the Fe is seen settling down as the reaction occurs. Al, being higher in the reactivity series, displaces Fe in FeSO_4 .
31	(a) Reaction: $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$ • Substance oxidised: Carbon ($\text{C} \rightarrow \text{CO}$) • Substance reduced: Zinc oxide ($\text{ZnO} \rightarrow \text{Zn}$) (b) $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$ (c) Electrolytic decomposition: Decomposition of water into hydrogen and oxygen using electricity Decomposition by sunlight: Silver chloride (AgCl) decomposes to silver and chlorine in sunlight
32	(a) Balanced equation: $2\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$ (b) The reaction is a thermal decomposition reaction because ferrous sulphate decomposes upon heating into iron(III) oxide, Sulphur dioxide, and Sulphur trioxide. (c) The gases released are sulphur dioxide (SO_2) and Sulphur trioxide (SO_3). OR (c) An industrial application of decomposition reactions is the decomposition of limestone in cement manufacturing.

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