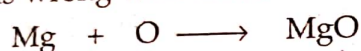


Very Short Answer Type Questions

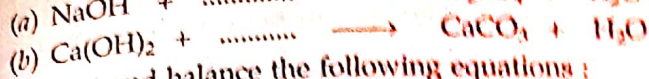
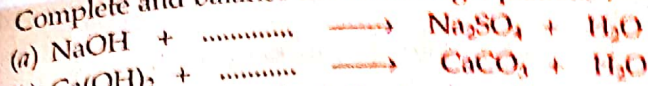
1. Why is respiration considered an exothermic process ?
2. On what basis is a chemical equation balanced ?
3. What happens chemically when quicklime is added to water filled in a bucket ?
4. Why should magnesium ribbon be cleaned before burning in air ?
5. State whether the following statement is true or false :
A chemical equation can be balanced easily by altering the formula of a reactant or product.
6. What is wrong with the following chemical equation ?



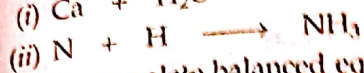
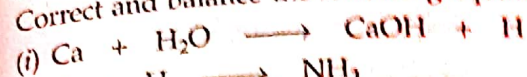
Correct and balance it.

7. What does the symbol (aq) represent in a chemical equation ?
8. Why is photosynthesis considered an endothermic reaction ?
9. How will you indicate the following effects in a chemical equation ?
 - (a) A solution made in water
 - (b) Exothermic reaction
 - (c) Endothermic reaction
10. Translate the following statements into chemical equations and then balance the equations :
 - (a) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.
 - (b) Phosphorus burns in oxygen to give phosphorus pentoxide.
 - (c) Carbon disulphide burns in air to give carbon dioxide and sulphur dioxide.
 - (d) Aluminium metal replaces iron from ferric oxide, Fe_2O_3 , giving aluminium oxide and iron.
 - (e) Barium chloride reacts with zinc sulphate to give zinc chloride and barium sulphate.
11. Write the balanced chemical equations for the following reactions :
 - (a) Calcium hydroxide + Carbon dioxide \longrightarrow Calcium carbonate + Water
 - (b) Aluminium + Copper chloride \longrightarrow Aluminium chloride + Copper

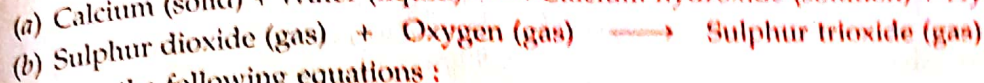
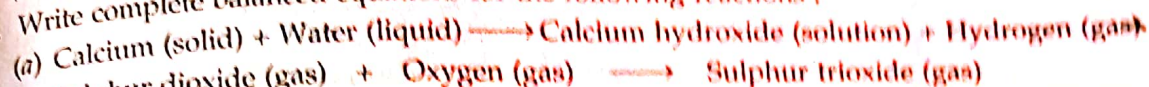
12. Complete and balance the following equations :



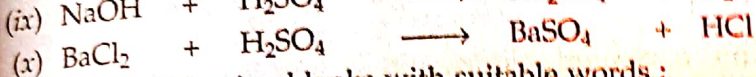
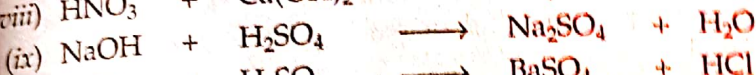
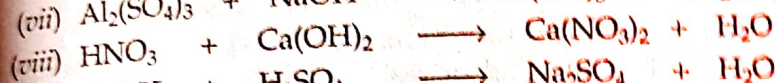
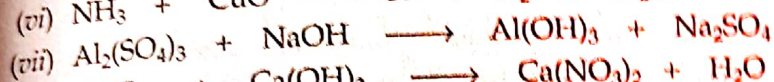
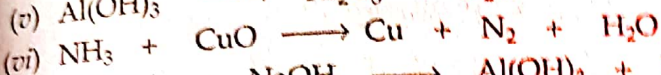
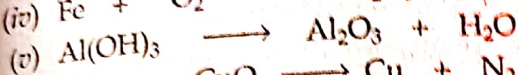
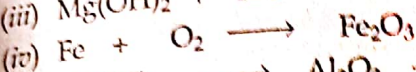
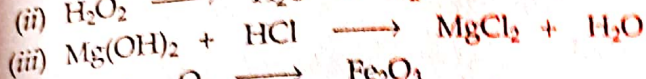
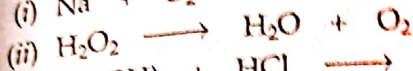
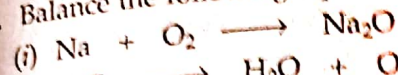
13. Correct and balance the following equations :



14. Write complete balanced equations for the following reactions :



15. Balance the following equations :



16. Fill in the following blanks with suitable words :

(a) Chemical equations are balanced to satisfy the law of

(b) A solution made in water is known as an solution and indicated by the symbol

Short Answer Type Questions

17. (a) Give one example of a chemical reaction.

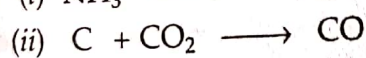
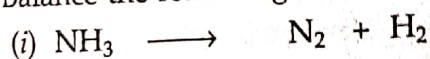
(b) State two characteristics of the chemical reaction which takes place when dilute sulphuric acid is poured over zinc granules.

(c) Give two characteristics of the chemical reaction which occurs on adding potassium iodide solution to lead nitrate solution.

18. (a) What is a chemical equation ? Explain with the help of an example.

(b) Giving examples, state the difference between balanced and unbalanced chemical equations.

(c) Balance the following chemical equations :



19. When hydrogen is passed over copper oxide, copper and steam are formed. Write a balanced equation for this reaction and state which of the chemicals are :

(i) elements (ii) compounds (iii) reactants

(iv) products (v) metals (vi) non-metals

20. (a) What are the various ways in which a chemical equation can be made more informative ? Give examples to illustrate your answer.

(b) Write balanced chemical equation from the following information :

An aqueous calcium hydroxide solution (lime water) reacts with carbon dioxide gas to produce a calcium carbonate precipitate and water.

21. (a) What is a balanced chemical equation ? Why should chemical equations be balanced ?

(b) Aluminium burns in chlorine to form aluminium chloride (AlCl_3). Write a balanced chemical equation for this reaction.

12. Complete and balance the following equations :
- (a) $\text{NaOH} + \dots \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
- (b) $\text{Ca(OH)}_2 + \dots \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
13. Correct and balance the following equations :
- (i) $\text{Ca} + \text{H}_2\text{O} \longrightarrow \text{CaOH} + \text{H}$
- (ii) $\text{N} + \text{H} \longrightarrow \text{NH}_3$
14. Write complete balanced equations for the following reactions :
- (a) Calcium (solid) + Water (liquid) \longrightarrow Calcium hydroxide (solution) + Hydrogen (gas)
- (b) Sulphur dioxide (gas) + Oxygen (gas) \longrightarrow Sulphur trioxide (gas)
5. Balance the following equations :
- (i) $\text{Na} + \text{O}_2 \longrightarrow \text{Na}_2\text{O}$
- (ii) $\text{H}_2\text{O}_2 \longrightarrow \text{H}_2\text{O} + \text{O}_2$
- (iii) $\text{Mg(OH)}_2 + \text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2\text{O}$
- (iv) $\text{Fe} + \text{O}_2 \longrightarrow \text{Fe}_2\text{O}_3$
- (v) $\text{Al(OH)}_3 \longrightarrow \text{Al}_2\text{O}_3 + \text{H}_2\text{O}$
- (vi) $\text{NH}_3 + \text{CuO} \longrightarrow \text{Cu} + \text{N}_2 + \text{H}_2\text{O}$
- (vii) $\text{Al}_2(\text{SO}_4)_3 + \text{NaOH} \longrightarrow \text{Al(OH)}_3 + \text{Na}_2\text{SO}_4$
- (viii) $\text{HNO}_3 + \text{Ca(OH)}_2 \longrightarrow \text{Ca(NO}_3)_2 + \text{H}_2\text{O}$
- (ix) $\text{NaOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
- (x) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + \text{HCl}$
6. Fill in the following blanks with suitable words :
- (a) Chemical equations are balanced to satisfy the law of
- (b) A solution made in water is known as an solution and indicated by the symbol

Part Answer Type Questions

7. (a) Give one example of a chemical reaction.
- (b) State two characteristics of the chemical reaction which takes place when dilute sulphuric acid is poured over zinc granules.
- (c) Give two characteristics of the chemical reaction which occurs on adding potassium iodide solution to lead nitrate solution.
8. (a) What is a chemical equation ? Explain with the help of an example.
- (b) Giving examples, state the difference between balanced and unbalanced chemical equations.
- (c) Balance the following chemical equations :
- (i) $\text{NH}_3 \longrightarrow \text{N}_2 + \text{H}_2$
- (ii) $\text{C} + \text{CO}_2 \longrightarrow \text{CO}$
9. When hydrogen is passed over copper oxide, copper and steam are formed. Write a balanced equation for this reaction and state which of the chemicals are :
- (i) elements (ii) compounds (iii) reactants
- (iv) products (v) metals (vi) non-metals
10. (a) What are the various ways in which a chemical equation can be made more informative ? Give examples to illustrate your answer.
- (b) Write balanced chemical equation from the following information :
- An aqueous calcium hydroxide solution (lime water) reacts with carbon dioxide gas to produce a solid calcium carbonate precipitate and water.
- (a) What is a balanced chemical equation ? Why should chemical equations be balanced ?
- (b) Aluminium burns in chlorine to form aluminium chloride (AlCl_3). Write a balanced chemical equation for this reaction.

- (c) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas. Write a balanced chemical equation for this reaction.
22. (a) Explain, with example, how the physical states of the reactants and products can be shown in a chemical equation.
- (b) Balance the following equation and add state symbols :
- $$\text{Zn} + \text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$$
- (c) Convey the following information in the form of a balanced chemical equation :
 "An aqueous solution of ferrous sulphate reacts with an aqueous solution of sodium hydroxide to form a precipitate of ferrous hydroxide and sodium sulphate remains in solution."
23. Write any two observations in an activity which may suggest that a chemical reaction has taken place. Give an example in support of your answer.
24. (a) Aluminium hydroxide reacts with sulphuric acid to form aluminium sulphate and water. Write a balanced equation for this reaction.
- (b) Balance the following chemical equation :
- $$\text{MnO}_2 + \text{HCl} \longrightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$$
25. Write the balanced equations for the following reactions, and add the state symbols :
- (a) Magnesium carbonate reacts with hydrochloric acid to produce magnesium chloride, carbon dioxide and water.
- (b) Sodium hydroxide reacts with sulphuric acid to produce sodium sulphate and water.
26. Carbon monoxide reacts with hydrogen under certain conditions to form methanol (CH_3OH). Write a balanced chemical equation for this reaction indicating the physical states of reactants and product as well as the conditions under which this reaction takes place.
27. (a) Potassium chlorate (KClO_3) on heating forms potassium chloride and oxygen. Write a balanced equation for this reaction and indicate the evolution of gas.
- (b) Rewrite the following information in the form of a balanced chemical equation :
 Magnesium burns in carbon dioxide to form magnesium oxide and carbon.
28. (a) Substitute formulae for names and balance the following equation :
 Calcium carbonate reacts with hydrochloric acid to produce calcium chloride, water and carbon dioxide gas.
- (b) Write balanced chemical equation with state symbols for the following reaction :
 Sodium hydroxide solution reacts with hydrochloric acid solution to produce sodium chloride solution and water.
29. Ammonia reacts with oxygen to form nitrogen and water. Write a balanced chemical equation for this reaction. Add the state symbols for all the reactants and products.
30. Write a balanced chemical equation for the process of photosynthesis giving the physical states of all the substances involved and the conditions of the reaction.
31. Translate the following statement into chemical equation and then balance it :
 Barium chloride solution reacts with aluminium sulphate solution to form a precipitate of barium sulphate and aluminium chloride solution.
32. When potassium nitrate is heated, it decomposes into potassium nitrite and oxygen. Write a balanced equation for this reaction and add the state symbols of the reactants and products.

Long Answer Type Questions

33. (a) What is meant by a chemical reaction ? Explain with the help of an example.
- (b) Give one example each of a chemical reaction characterised by :
- evolution of a gas
 - change in colour
 - formation of a precipitate
 - change in temperature
 - change in state.

34. (a) State the various characteristics of chemical reactions.
(b) State one characteristic each of the chemical reaction which takes place when :
(i) dilute hydrochloric acid is added to sodium carbonate
(ii) lemon juice is added gradually to potassium permanganate solution
(iii) dilute sulphuric acid is added to barium chloride solution
(iv) quicklime is treated with water
(v) wax is burned in the form of a candle
35. (a) What do you understand by exothermic and endothermic reactions ?
(b) Give one example of an exothermic reaction and one of an endothermic reaction.
(c) Which of the following are endothermic reactions and which are exothermic reactions ?
(i) Burning of natural gas (ii) Photosynthesis
(iii) Electrolysis of water (iv) Respiration
(v) Decomposition of calcium carbonate

Multiple Choice Questions (MCQs)

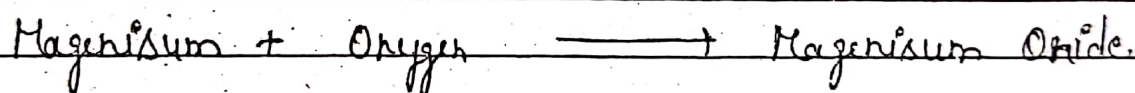
36. One of the following does not happen during a chemical reaction. This is :
(a) Breaking of old chemical bonds and formation of new chemical bonds
(b) Formation of new substances with entirely different properties
(c) Atoms of one element change into those of another element to form new products.
(d) A rearrangement of atoms takes place to form new products.
37. Which of the following does not involve a chemical reaction ?
(a) digestion of food in our body
(b) process of respiration
(c) burning of candle wax when heated
(d) melting of candle wax on heating
38. You are given the solution of lead nitrate. In order to obtain a yellow precipitate you should mix with it a solution of :
(a) potassium chloride (b) potassium nitride
(c) potassium sulphide (d) potassium iodide
39. An acid which can decolourise purple coloured potassium permanganate solution is :
(a) sulphuric acid (b) citric acid
(c) carbonic acid (d) hydrochloric acid
40. The chemical reaction between two substances is characterised by a change in colour from orange to green. These two substances are most likely to be :
(a) potassium dichromate solution and sulphur dioxide
(b) potassium permanganate solution and sulphur dioxide
(c) potassium permanganate solution and lemon juice
(d) potassium dichromate solution and carbon dioxide.
41. The chemical reaction between quicklime and water is characterised by :
(a) evolution of hydrogen gas
(b) formation of slaked lime precipitate
(c) change in temperature of mixture
(d) change in colour of the product
42. One of the following is an endothermic reaction. This is :
(a) combination of carbon and oxygen to form carbon monoxide
(b) combination of nitrogen and oxygen to form nitrogen monoxide
(c) combination of glucose and oxygen to form carbon dioxide and water
(d) combination of zinc and hydrochloric acid to form zinc chloride and hydrogen
43. Which of the following is not an endothermic reaction ?
(a) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$

Chapter-1Chemical Reactions and EquationsChemical Reaction

Chemical Reaction are the process in which new substances with new properties are formed. During a chemical reaction atom of one element do not change into those of another element only a rearrangement of atom take place is a chemical reaction. Every chemical reaction has two parts:-

- i) The substances which take part in a chemical reaction are called reactant.
- ii) The new substances produced as a result of chemical reaction are called product.

Example: When a magnesium ribbon is heated it burns in air with a white flame to form a white powder called magnesium oxide.



Before burning in air the magnesium ribbon is cleaned by rubbing with a sand paper. This is done to remove the protective layer of magnesium oxide from the surface of the magnesium ribbon.

Note - Souring of milk, formation of curd from milk, cooking of food, digestion of food in our body, fermentation of grapes, rusting of iron, burning of fuel, burning of candle wax, Ripening of fruit are called chemical changes. But melting of ice is physical process.

Characteristics of Chemical Reactions.

1) * Evolution of a gas

* Some chemical reactions are characterised by the evolution of a gas.

Example: The chemical reaction between zinc and dilute sulphuric acid (H_2SO_4) is characterised by evolution of hydrogen gas.

* The chemical reaction between sodium carbonate and dilute hydrochloric acid (HCL) is characterised by the evolution of carbon dioxide gas.

2) * Formation of precipitate

A precipitate is a solid product which separates out from the solution during a chemical reaction. Some chemical reactions are characterised by the formation of a precipitate.

Example: The chemical reaction between potassium iodide and lead nitrate is characterised by the formation of a yellow precipitate of lead iodide.

* The chemical reaction between sulphuric acid and barium chloride solution is characterised by the formation of a white precipitate of barium sulphate.

3) * Change in colour

Some chemical reactions are characterised by a change in colour.

Example: The chemical reaction between citric acid and purple coloured potassium permanganate solution is characterised by a change in colour from purple to colourless.

* The chemical reaction between sulphur dioxide gas and acidified potassium dichromate solution is characterised by a change in colour from orange to green.

Note: Calcium oxide is known as 'lime' or 'quicklime', and calcium hydroxide is known as 'slaked lime'.

4) * Change in temperature
Some chemical reaction characterised by a change in temperature.

Example + The chemical reaction between quicklime and water to form slaked lime is characterised by a change in temperature. It is an exothermic reaction. (Heat producing reaction).

* The chemical reaction between zinc granules and dilute sulphuric acid is also characterised by a change in temperature. (It is an exothermic reaction).

* The chemical reaction between barium hydroxide and ammonium chloride to form barium chloride, ammonia and water is characterised by a change in temperature. (It is an endothermic reaction). (Heat absorbing reaction).

5) * Change in state

Some chemical reaction are characterised by a change in state.

Example + The combustion reaction of candle wax is characterised by a change in state. Wax is a solid, water formed by the combustion of wax is a liquid at room temperature, whereas CO_2 produced by the combustion of

wax is gas).

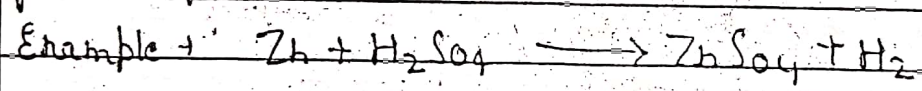
Chemical Equations

The method of representing a chemical reaction with the help of symbol and formula of the substances involved in it is known as a chemical equation.

The substance which combined or react are known as reactants. The new substances produced in a reaction is known as product. The arrow (\longrightarrow) sign pointing towards right hand side is put between the reactant and product. A chemical equation is a short hand method of representing a chemical reaction.

Balanced chemical equations

A balanced chemical equation has an equal number of atoms of different elements in the reactant and product.

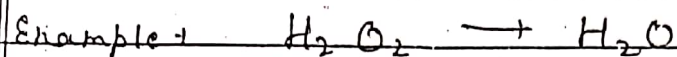


	In reactants		In product	
No. of Zn atom	1		1	
" H atom	2		2	
" S atom	1		1	
" O atom	4		4	

A balanced chemical equation has equal masses of various element and product.

Unbalanced Chemical Equation

A unbalanced chemical equation has an unequal number of atom of one or more element in the reactant and product.



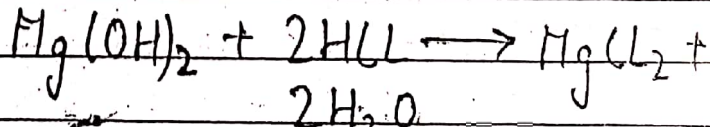
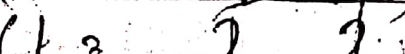
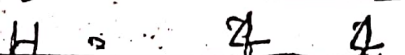
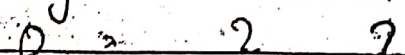
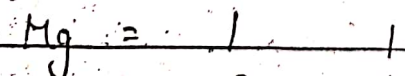
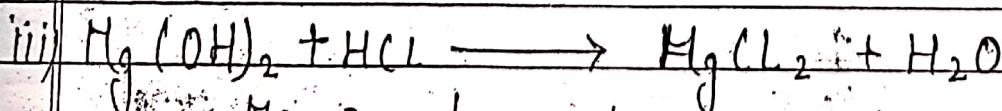
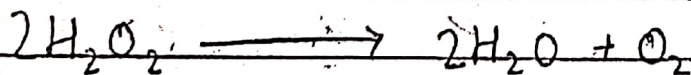
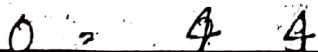
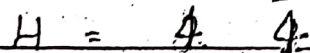
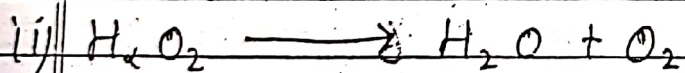
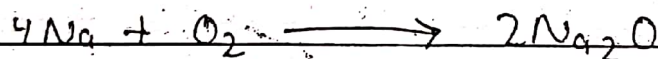
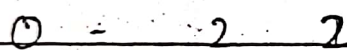
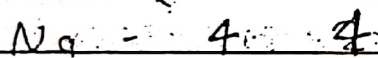
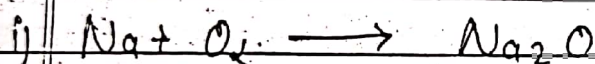
	In reactants	In product
No. of H atom	✓	✓
" O atom	✓	1

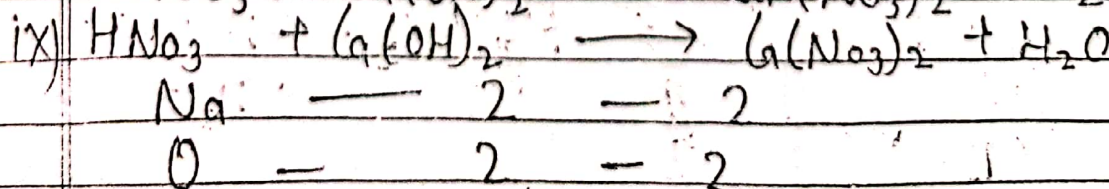
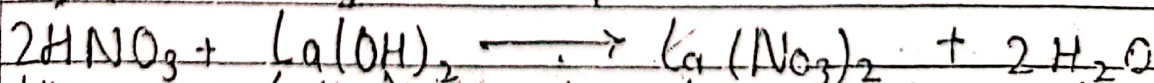
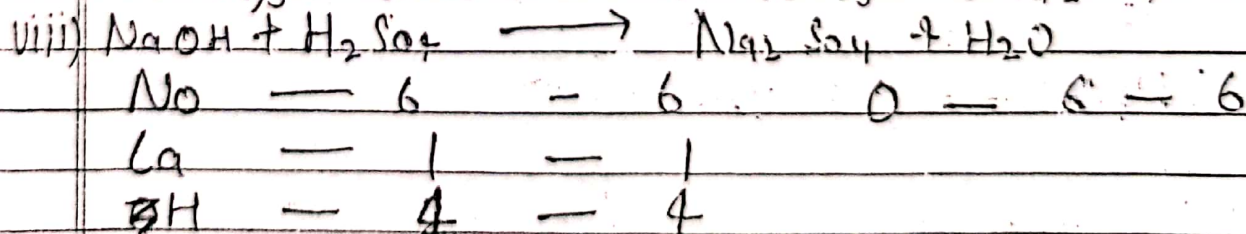
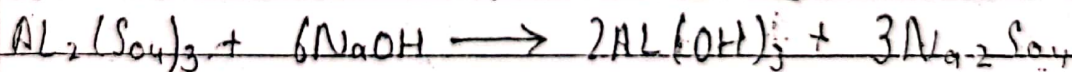
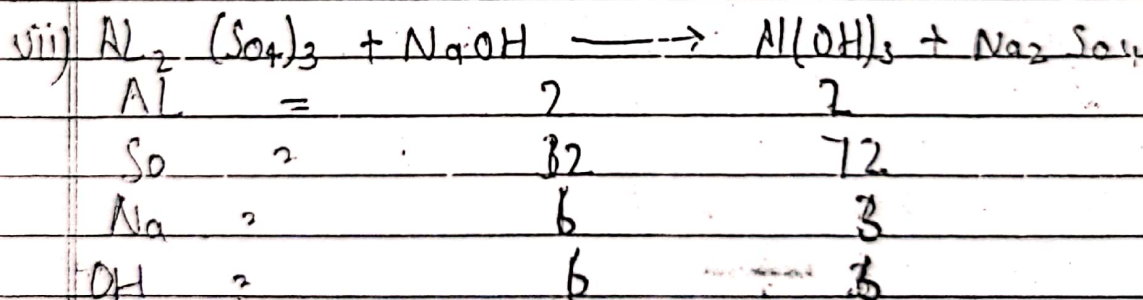
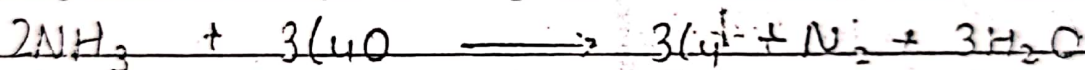
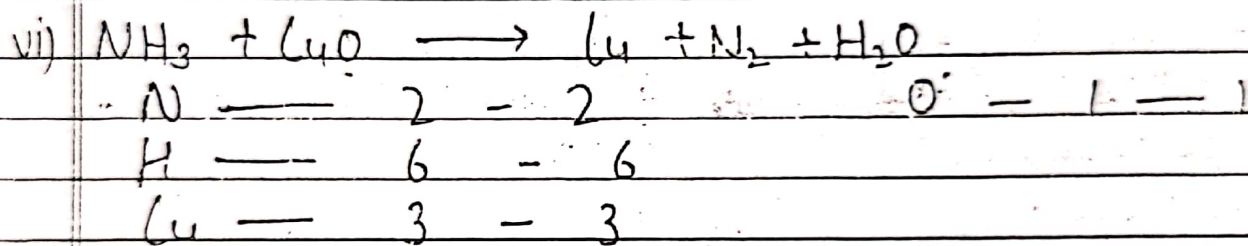
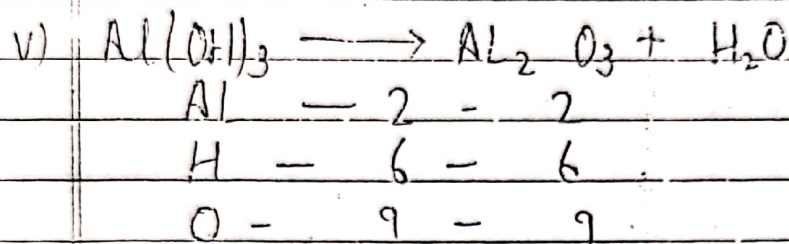
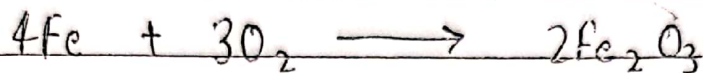
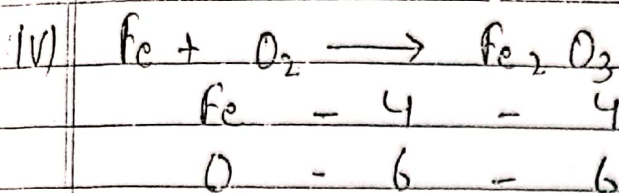
An unbalanced equation is has unequal masses of various element in reactant and product.

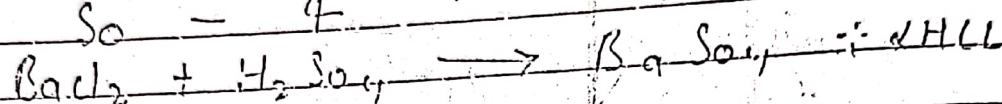
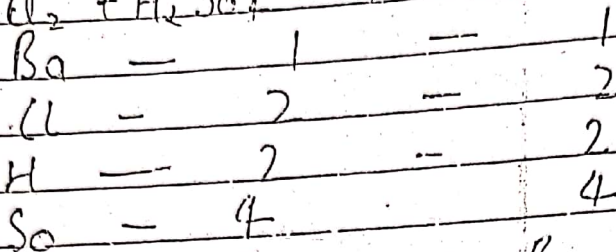
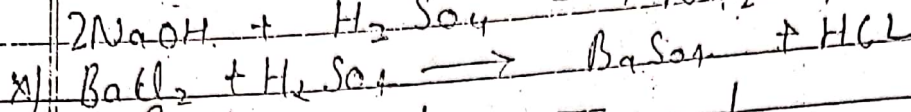
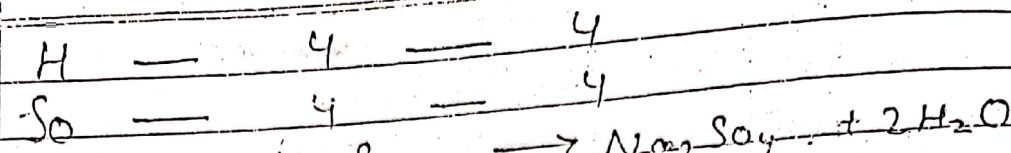
Balancing of chemical equation.

The process of making the no. of different types of atom equal on the both the side of an equation is called balancing of an equation.

Balance the following equation.







Step of writing of balanced word's chemical equation:-

Step 1

* Write down the chemical eq reaction in the form of word equation keeping the reactants from the left side and product from the right side.

Step 2:- Put the symbols and formula of all the reactant and product in the word equation

Step 3:- Balance the equation by multiplying the symbol and formula by the smallest possible figure.

Step 4:- If possible make the equation more informative by indicating the physical state of reactant and product by indicating the heat changes if any taking place in the reaction by indicating the conditions under which the reaction takes place if however you do not have sufficient information regarding the physical state.

Write a balance chemical equation with straight symbol for the following reaction.

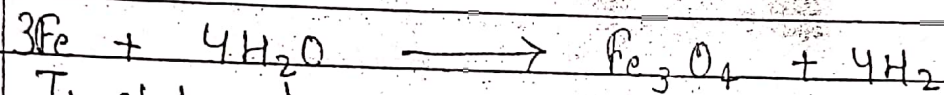
Heated iron metal react with steam to form iron oxide, Fe_3O_4 and Hydrogen

Iron + Steam \longrightarrow Iron oxide + Hydrogen

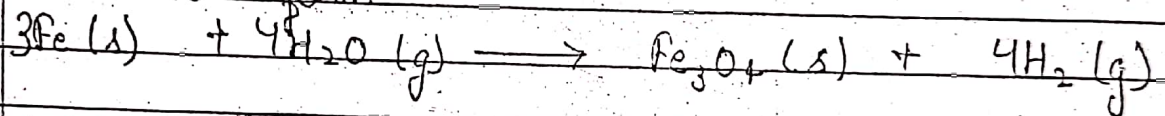
$$\text{Fe} + \text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$$

After balance equation

Fe	-	3	3
H	-	8	8
O	-	4	4

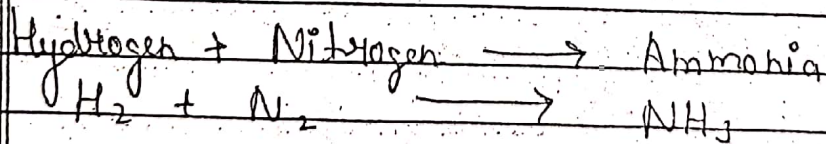


In state form

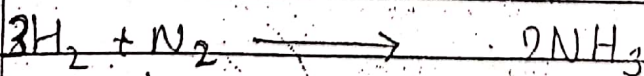


Translate the following statement into chemical equation and then balance the equation.

Hydrogen combine with Nitrogen to form Ammonia



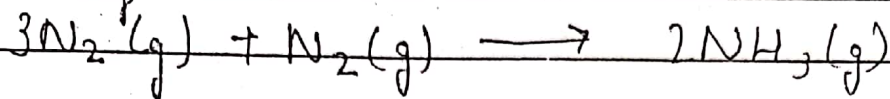
H	-	2	3
N	-	2	1



After balance equation

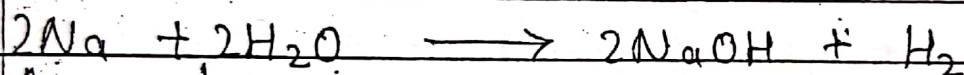
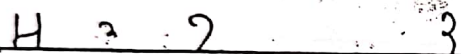
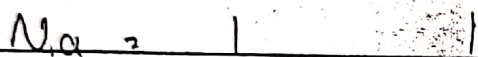
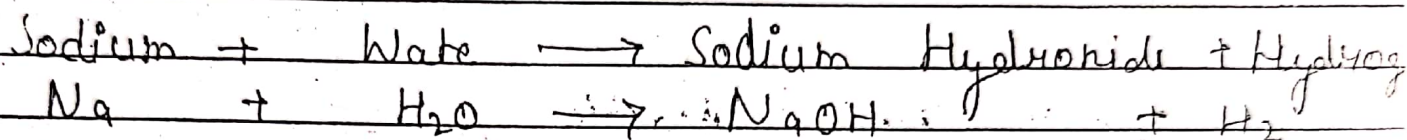
H	=	6	6
N	=	2	2

State form

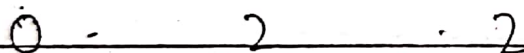
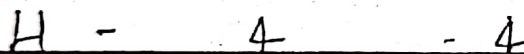
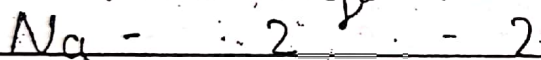


Write the balance chemical equation for the following reaction.

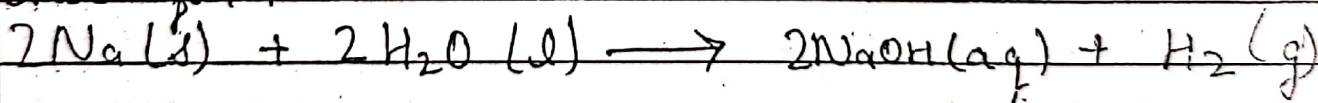
Sodium metal react with water to give sodium Hydroxide and Hydrogen



After balance equation.

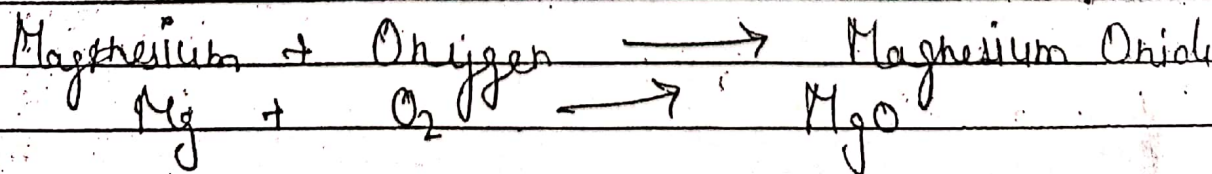


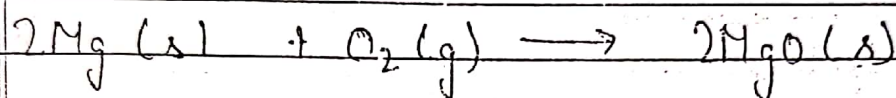
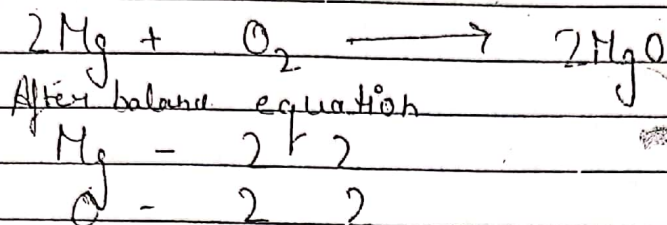
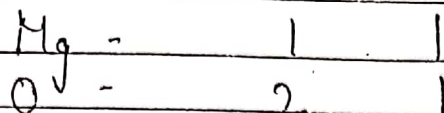
State form



Write the balance chemical equation for the following chemical reaction.

Magnesium burn in Oxygen to form Magnesium Oxide



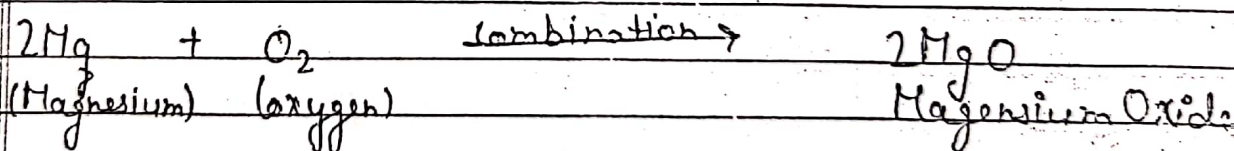


Types of Chemical Reaction

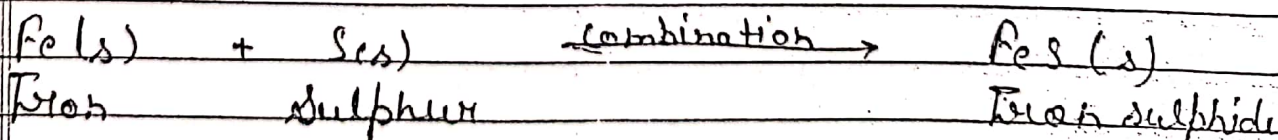
Combination Reaction

Those reactions in which two or more substances combined to form a single substance are called combination reaction.

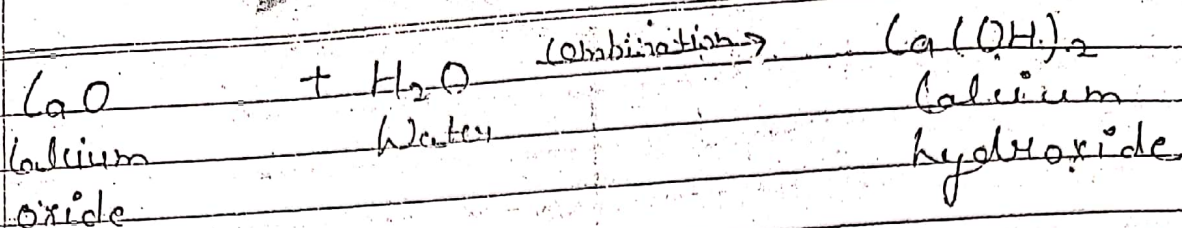
Example 1 → When we burn a magnesium ribbon in air then a combination reaction takes place.



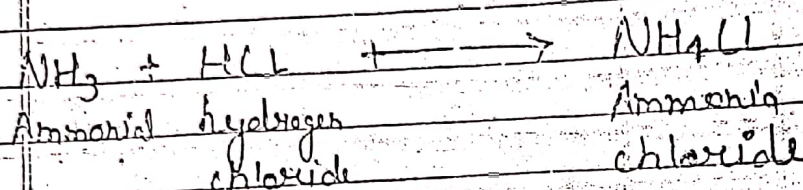
Example 2 → When iron powder is heated with sulphur, iron sulphide is formed.



Example 3 → Calcium oxide (quicklime/lime) reacts with water to form calcium hydroxide (slaked lime).



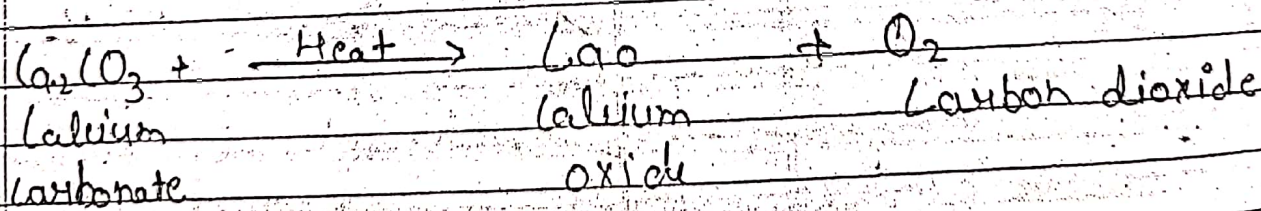
Exo Example 4: Ammonia react with hydrogen chloride to form ammonia chloride



Decomposition Reaction

These reaction in which a compound splits up into two or more simpler substances are known as decomposition reaction. A decomposition reaction is just the opposite of a combination reaction.

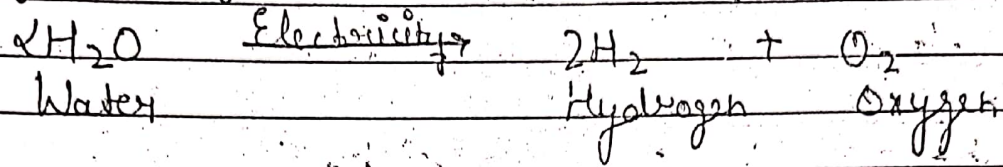
Example 1 When calcium carbonate is heated. It decomposes to give calcium oxide and carbon dioxide.



When a decomposition reaction is carried out by heating. It is called thermal decomposition.

Important Example

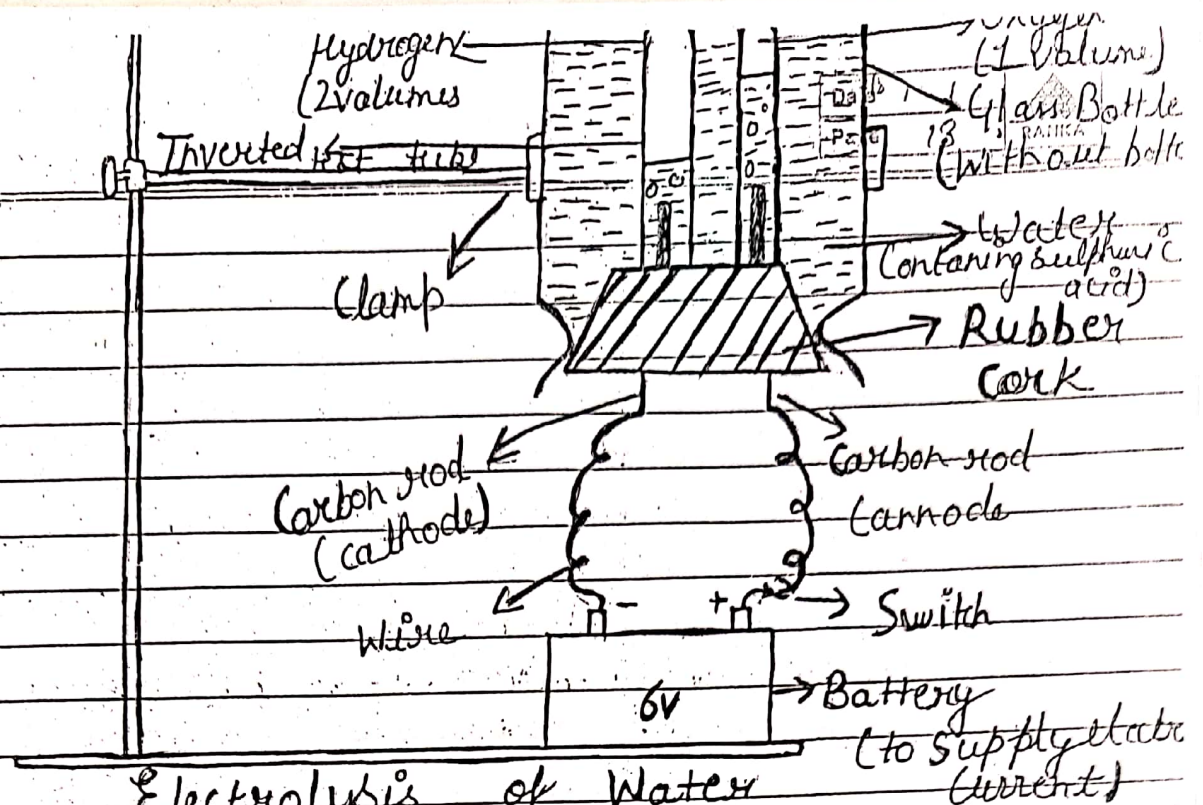
Example-2 When electric current is passed acidified water. It decomposes to give Hydrogen and Oxygen gas.



This decomposition reaction takes place by the reaction of electricity. This is called electrolysis of water.

Electrolysis of water

- * Take a bottle B & fix it on a stand in an inverted position.
- * A rubber cork having two holes is fitted in the neck of the bottle with two carbon rods.
- * Fill the glass bottle two-thirds of water & add a few drops of dilute sulphuric acid.
- * Two similar test tubes filled with water are carefully inverted over the two carbon electrodes.
- * Connect the outer end of carbon rod by 6 volt battery. Negative terminal is called cathode and positive terminal is called anode.
- * Pass an electric current through water by turning on the switch. We will see the bubble being formed at both the carbon electrodes inside the test tube.



Electrolysis of Water

- * The gases formed at the two electrodes collecting in top part of the inverted test tube. The volume of gas in the two test tube is not same.
- * When both tubes are filled with the gas then a burning candle is set near the mouth of the left test tube. The gas in it burns rapidly making a popping sound so the gas collected in the left side is hydrogen which has double volume.
- * When the burning candle is taken near the bowl of the right side test tube the candle starts burning brightly so the gas collected in the right side test tube over positive ^{upload} which had 1 volume oxygen.