

CHAPTER 1

Chemical Reaction and Equation

2.1 INTRODUCTION

Chemistry is the branch of science in which we study the composition, properties and transformation of matter. We observe changes in matter all around us. These changes are of two types:

2.1.1 Physical Change

A change in which there is a change in physical appearance of a substance but no change in its basic composition, is known as a physical change. For example, melting of butter and wax, boiling of water, dissolving of salt in water, breaking of glass, sublimation of a solid on heating, etc. No new chemical substance is formed in a physical change.

2.1.2 Chemical Change

A change in which one or more new substances having properties and compositions different from the original substance are formed, is known as a chemical change. For example, burning of paper, wood, coal and magnesium ribbon, making of curd from milk, digestion of food, ripening of fruits, bursting of a cracker, boiling of egg, etc. Chemical changes are also called chemical reactions.

A chemical reaction is accompanied by changes in physical state, formation of a precipitate, change of colour, change in temperature or evolution of a gas.

Normally, a chemical change is permanent and cannot be reversed easily.

2.2 CHEMICAL EQUATION

2.2.1 Word Equation

A word equation simply shows the change of reactants to products through an arrow placed between them. The reactants are written on the left-hand side (LHS) with a plus sign in case of two or more reactants and the products are written on the right-hand side (RHS) with a plus sign in case of two or more products. The arrowhead shows the direction of the reaction pointing towards the products.

2.2.2 Skeletal Chemical Equation

A chemical equation in which symbols and formulae are used instead of words to show a chemical reaction is called a skeletal chemical equation.

2.2.3 Balanced Chemical Equation

A chemical equation in which the number of atoms of each element of reactants is equal to that of products, is called a balanced chemical equation.

2.2.4 Balancing a Chemical Equation

Equalising the number of atoms of each element on reactants and products sides of a chemical equation is called balancing a chemical equation.

1. A chemical equation can be made more informative by adding physical states of reactants and products, reaction conditions, heat change during the reaction, i.e., heat released or absorbed, concentration of reactants and products, speed or rate of the reaction, i.e., slow or fast, and nature of the reaction, i.e., forward or backward to the

equation.

2.2.5 Characteristics of Chemical Equations

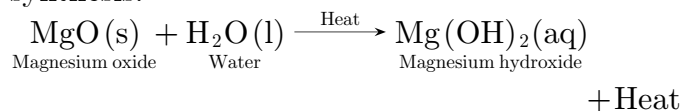
1. Chemical equation gives the names of different reactants and products of a chemical reaction.
2. It gives the number of atoms or molecules of reactants and products of a chemical reaction.
3. Chemical equation gives relative number of moles of reactants and products.
4. It gives the relative amount by mass or weight of reactants and products.
5. Chemical equation also gives relative volume of gaseous reactants and products.

2.3 TYPES OF CHEMICAL REACTIONS

2.3.1 Combination Reaction

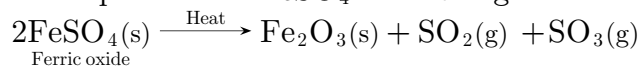
A reaction in which two or more substances combine together to form a single product is known as a combination reaction.

The combination reaction is often called synthesis.



2.3.2 Decomposition Reaction

The reaction in which a single substance breaks down to form two or more substances, is called a decomposition reaction. For example, decomposition of FeSO_4 on heating.



2.3.3 Displacement Reaction

The reaction in which one atom or a group of atoms of a compound is replaced by another atom, is called a displacement reaction. Generally, a more reactive metal displaces a less reactive metal from its salt solution in displacement reaction.

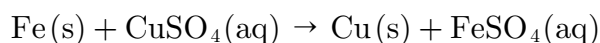
The series in which metals are arranged in the decreasing order of their reactivity is called activity series of metals.

Potassium (K)	Most reactive
Sodium (Na)	Decreasing reactivity ↓
Calcium (Ca)	
Magnesium (Mg)	
Aluminium (Al)	
Zinc (Zn)	
Iron (Fe)	
Lead (Pb)	
Copper (Cu)	
Silver (Ag)	
Gold (Au)	
Platinum (Pt)	Least reactive

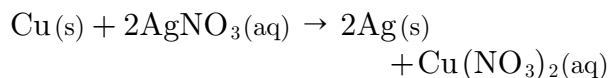
Activity series of some common metals

Few examples of displacement reactions are as follows:

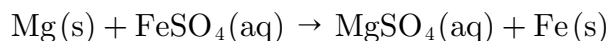
1. Displacement of copper from a solution of copper sulphate by iron



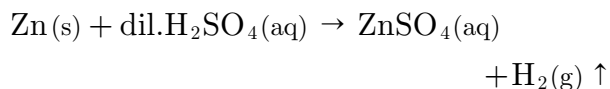
2. Displacement of silver from silver nitrate solution by copper



3. Displacement of iron from iron sulphate solution by magnesium

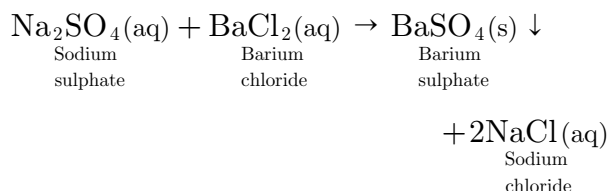


4. Zinc displaces hydrogen from dilute sulphuric acid.



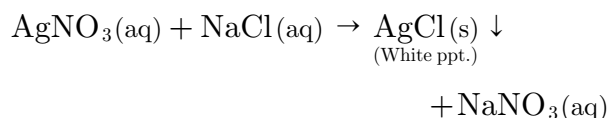
2.3.4 Double Displacement Reaction

The reaction in which anions and cations of two different molecules exchange places, forming two completely different compounds, is called double displacement reaction. For example,

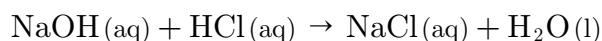


The common types of double displacement reactions are as follows:

- Precipitation Reaction** : It is a chemical reaction in which one of the products is precipitated as an insoluble solid. For example,



- Neutralisation Reaction** : It is chemical reaction in which a strong acid and a strong base react with each other to form water and salt. For example,



2.3.5 Redox Reaction

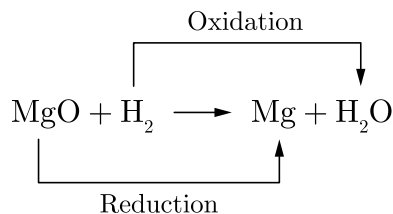
- Oxidation** : If a substance gains oxygen or loses hydrogen in a reaction, the substance is said to be oxidised and the process is known as oxidation.
 - Reduction** : If a substance loses oxygen and gains hydrogen in a reaction, the substance is said to be reduced and the process involved is known as reduction.
- Reduction and oxidation take place simultaneously in few reactions. Such reactions are known as redox reactions.
- Oxidising Agent** : If a substance oxidises the other substance but itself gets reduced, then it is known as an oxidising agent.
 - Reducing Agent** : If a substance reduces the other substance but itself gets oxidised, then it is known as a reducing agent.

For example,



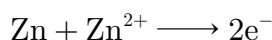
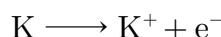
Here, H_2 is the reducing agent as it reduces MgO to Mg and itself gets oxidised to H_2O . On the other hand, magnesium oxide is the oxidising agent which oxidises H_2 to H_2O and itself gets reduced to Mg .

Thus, an oxidising agent gets reduced and a reducing agent gets oxidised in a redox reaction.

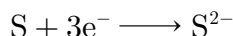
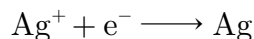


2.3.6 Electronic Concept of Oxidation and Reduction

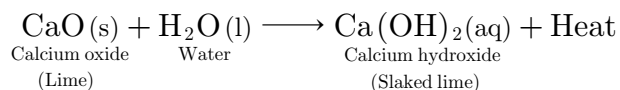
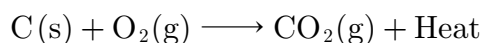
Oxidation is the loss of electrons by a species (an atom, a molecule or an ion).



Reduction is the gain of electrons by a species (an atom, a molecule or an ion).



- Exothermic Reaction** : A chemical reaction in which heat is released along with the formation of product, is called exothermic reaction. For example,



- Endothermic Reaction** : A chemical reaction in which heat is absorbed along with the formation of product, is called endothermic reaction. For example,



2.3.7 Corrosion

It is the process of slow conversion of metals into their undesirable compounds by the attack of air (oxygen) and moisture.

- Rusting** : When iron and iron articles are exposed to air and water, a reddish-brown layer is formed on the surface. This layer is called rust [hydrated iron(III) oxide, $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$]. Hence, corrosion of iron is

known as rusting.

2. **Rancidity** : When cooked food items containing oil and fat are kept exposed and unprotected, they become rancid and produce an unpleasant smell and taste. The phenomenon involved here is known as rancidity.
3. **Prevention of Rancidity** : Rancidity can be prevented by adding antioxidants, keeping food items at low temperature, keeping food items in vacuum packing or airtight container and replacing air by nitrogen gas.

□□□□□□

MULTIPLE CHOICE QUESTIONS

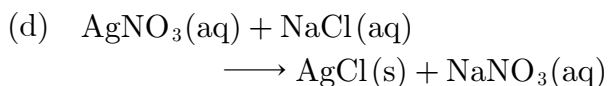
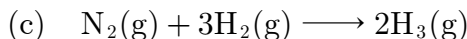
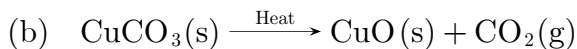
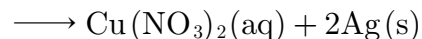
1. A solution of substance X is used for white washing. Here X is:
 - (a) CaO
 - (b) CaO_2
 - (c) NaCl
 - (d) KCl

2. Which of the following statements about the reaction below are incorrect?
$$2\text{PbO}(\text{s}) + \text{C}(\text{s}) \longrightarrow 2\text{Pb}(\text{s}) + \text{CO}_2(\text{g})$$
 1. Lead is getting reduced.
 2. Carbon dioxide is getting oxidised.
 3. Carbon is getting oxidised.
 4. Lead oxide is getting reduced.
 - (a) 1 and 2
 - (b) 1 and 3
 - (c) 1, 2 and 3
 - (d) all of the above

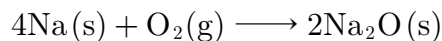
3.
$$\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$$
The above reaction is an example of a
 - (a) combination reaction.
 - (b) double displacement reaction.
 - (c) decomposition reaction.
 - (d) displacement reaction.

4. What happens when dilute hydrochloric acid is added to iron filings?
 - (a) Hydrogen gas and iron chloride are produced.
 - (b) Chlorine gas and iron hydroxide are produced.

- (c) No reaction takes place.
 (d) Iron salt and water are produced.



5. Identify the substances that is oxidized and the substances that is reduced in the following reactions:



- (a) Na, O₂
 (b) Na, Na
 (c) O₂, Na
 (d) O₂, O₂

6. Identify the substances that is oxidized and the substances that is reduced in the following reactions:

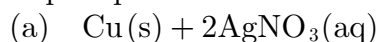


- (a) H₂, CuO
 (b) H₂, H₂O
 (c) H₂, Cu
 (d) Cu, H₂

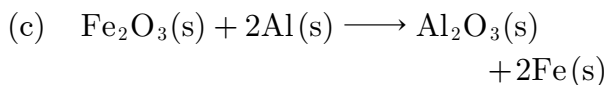
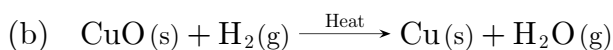
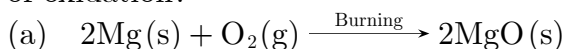
7. Translate the following statement into the chemical equation and choose the correct option "Hydrogen gas combines with nitrogen to form ammonia."

- (a) $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$
 (b) $\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \longrightarrow \text{NH}_2(\text{g})$
 (c) $2\text{H}(\text{g}) + \text{N}_2(\text{g}) \longrightarrow 2\text{NH}_3$
 (d) None of these

8. Which one of the following is the example of precipitation reaction?



9. Which one of the following is the example of oxidation?



- (d) None of these

10. A shiny brown coloured element X on heating in air becomes black in colour. Here X is:

- (a) Copper
 (b) Silver
 (c) Aluminium
 (d) Mercury

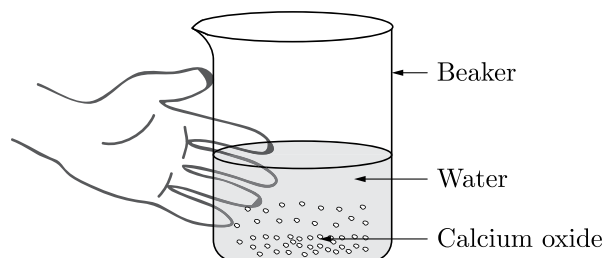
11. Which of the following statement is correct regarding to physical changes?

- (a) In physical change, new substance is formed.
 (b) In physical change, no new substance is formed.
 (c) In physical change, chemical composition of substance is changed.
 (d) None of these

12. $\text{FeS} + \text{H}_2\text{SO}_4 \longrightarrow \text{FeSO}_4 + \text{H}_2\text{S} \uparrow$.
In the above equation \uparrow indicates:
- gas evolved
 - insoluble substance formed
 - reactive element
 - element is not useful in chemical equation
13. $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{X}(\text{s}) + \text{Heat}$
+ Hissing sound.
Here X is:
- $\text{Cu}(\text{OH})$
 - $\text{Cu}(\text{OH})_2$
 - 2CaOH
 - Ca_2OH
14. The balancing of chemical equation is based on:
- Law of conservation of energy
 - Law of conservation of mass
 - Law of conservation of heat
 - None of these
15. When white silver chloride is left exposed to sunlight, its colour becomes:
- Gray
 - Yellow
 - Green
 - Red
16. Complete the following chemical reaction with correct option:
 $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \longrightarrow \dots + 2\text{KNO}_3$
- PbI_2
 - PbNO_3
 - $\text{Pb}(\text{NO}_3)_2$
 - PbIO_3
17. Which of the following is not a chemical reaction?
- Souring of milk
 - Dissolution of sugar in water
 - Rusting of iron
 - Digestion of food in the body
18. $\text{Na}_2\text{CO}_3 + \text{XHCl} \longrightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$
In above reaction, the value of X is:
- 1
 - 2
 - 3
 - 4
19. $\text{PCl}_5(\text{s}) + \text{XH}_2\text{O}(\text{l}) \longrightarrow \text{YH}_3\text{PO}_4(\text{aq})$
+ $\text{ZHCl}(\text{aq})$.
The value of X, Y and Z are:
- $X-4, Y-3, Z-3$
 - $X-4, Y-1, Z-5$
 - $X-1, Y-2, Z-3$
 - $X-5, Y-1, Z-2$
20. What happens when ferrous sulphate crystals are heated?
- A gas having the smell of burning sulphur is evolved.
 - No gas is evolved.
 - Brown coloured gas is evolved.

- (d) Colourless and odourless gas is evolved.
21. In the reaction $\text{Br}_2 + 2\text{I}^- \longrightarrow 2\text{Br}^- + \text{I}_2$, the oxidising agent is:
- (a) Br_2
(b) I^-
(c) Br^-
(d) I_2
22. Which of the following is not a thermal decomposition reaction?
- (a) $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$
(b) $\text{ZnCO}_3 \longrightarrow \text{ZnO} + \text{CO}_2$
(c) $2\text{FeSO}_4 \longrightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
(d) $2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 + \text{O}_2$
23. $\text{Y} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$. In the above reaction, Y is:
- (a) Aluminium
(b) Copper
(c) Sodium
(d) Zinc
24. The chemical reactions in which one element takes the position or place of another element present in a compound are called reaction.
- (a) Decomposition
(b) Combination
(c) Precipitation
(d) Displacement
25. Which of the following example is a decomposition reaction?
- (a) Evaporation of water
(b) Exposure of photographic film in the presence of light
(c) Heating sulphur in the presence of oxygen
(d) Dissolving salt in water
26. When petrol, in the presence of oxygen gas, burns inside the engine of a car, carbon dioxide and water are produced. The temperature inside the engine becomes very high. Which of the following statements is correct?
- (a) The burning of petrol is an example of a physical change.
(b) Heat energy is taken out from the surroundings.
(c) Oxygen and petrol are the reactants in this process.
(d) This process is triggered by light energy.

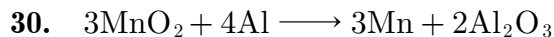
27. Calcium oxide reacts vigorously with water.



Identify the incorrect statements.

1. It is an endothermic reaction.
 2. Slaked lime is produced.
 3. Quick lime is produced.
 4. It is an exothermic reaction.
 5. It is a combination reaction.
- (a) 1 and 2
(b) 3 and 4
(c) 1 and 3
(d) 2, 4 and 5
28. Which of the following statements about the reaction given below are incorrect?
- $$2\text{PbO}(s) + \text{C}(s) \longrightarrow 2\text{Pb}(s) + \text{CO}_2(g)$$
1. Lead is getting reduced.
 2. Carbon dioxide is getting oxidised.
 3. Carbon is getting oxidised.
 4. Lead oxide is getting reduced.
- (a) 1 and 2
(b) 3 and 4
(c) 1 and 3
(d) 2 and 4
29. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of
- (a) a combination reaction

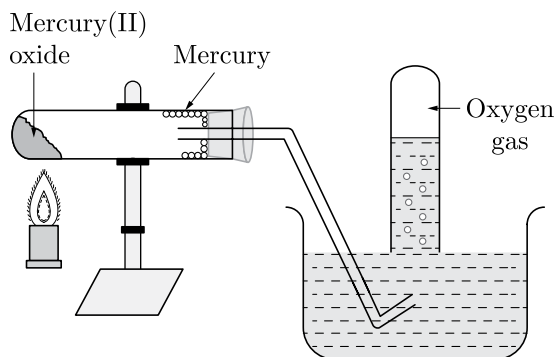
- (b) a displacement reaction
(c) a decomposition reaction
(d) a double displacement reaction



The oxidising agent in the above reaction is:

- (a) MnO_2
(b) Al
(c) Mn
(d) Al_2O_3
31. Which of the following processes does not involve either oxidation or reduction?
- (a) Formation of slaked lime from quick lime
(b) Heating mercuric oxide
(c) Formation of manganese chloride from manganese oxide
(d) Formation of zinc from zinc blend

32. The given diagram represents a reaction.



- (a) Thermal decomposition
(b) Displacement
(c) Double displacement

- (d) Combination
33. On burning magnesium ribbon in air, it is observed that it burns brightly leaving behind a powder.
- White
 - Green
 - Yellow
 - Black
34. Which of the following is not a physical change?
- Boiling of water to give water vapour
 - Melting of ice to give water
 - Dissolution of salt in water
 - Combustion of Liquefied Petroleum Gas (LPG)
35. The following reaction is an example of a $4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \longrightarrow 4\text{NO}(\text{g}) + 4\text{H}_2\text{O}(\text{g})$
- displacement reaction
 - combination reaction
 - redox reaction
 - neutralisation reaction
- 1 and 4
 - 2 and 3
 - 1 and 3
 - 3 and 4
36. Which of the following statements about the given reaction are correct?
- $$3\text{Fe}(\text{s}) + 4\text{H}_2\text{O}(\text{g}) \longrightarrow \text{Fe}_3\text{O}_4(\text{s}) + 4\text{H}_2(\text{g})$$
- Iron metal is getting oxidised.
 - Water is getting reduced.
 - Water is acting as reducing agent.
 - Water is acting as oxidising agent.
- 1, 2 and 3
 - 3 and 4
 - 1, 2 and 4
 - 2 and 4
37. Which of the following are exothermic processes?
- Reaction of water with quick lime.
 - Dilution of an acid.
 - Evaporation of water.
 - Sublimation of camphor (crystals).
- 1 and 2
 - 2 and 3
 - 1 and 4
 - 3 and 4
38. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
- KMnO_4 is an oxidising agent, it oxidises FeSO_4 .
 - FeSO_4 acts as an oxidising agent and oxidises KMnO_4 .
 - The colour disappears due to dilution; no reaction is involved.
 - KMnO_4 is an unstable compound and decomposes in presence of FeSO_4 to a colourless compound.
39. Which among the following is (are) double

displacement reaction(s)?

1. $\text{Pb} + \text{CuCl}_2 \longrightarrow \text{PbCl}_2 + \text{Cu}$
2. $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$
3. $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$
4. $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

- (a) 1 and 4
- (b) Only 2
- (c) 1 and 2
- (d) 3 and 4

40. Which among the following statement(s) is(are) true?

Exposure of silver chloride to sunlight for a long duration turns grey due to

1. the formation of silver by decomposition of silver chloride.
2. sublimation of silver chloride.
3. decomposition of chlorine gas from silver chloride.
4. oxidation of silver chloride.

- (a) Only 1
- (b) 1 and 2
- (c) 2 and 3
- (d) Only 4

41. Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed?

1. It is an endothermic reaction.
2. It is an exothermic reaction.
3. The pH of the resulting solution will be more than seven.
4. The pH of the resulting solution will be less than seven.

- (a) 1 and 2

- (b) 2 and 3

- (c) 1 and 4

- (d) 3 and 4

42. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?

1. Displacement reaction
2. Precipitation reaction
3. Combination reaction
4. Double displacement reaction

- (a) Only 1
- (b) Only 2
- (c) Only 4
- (d) 2 and 4

43. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

- (a) 1 : 1
- (b) 2 : 1
- (c) 4 : 1
- (d) 1 : 2

44. Which of the following is(are) an endothermic process(es)?

1. Dilution of sulphuric acid
2. Sublimation of dry ice
3. Condensation of water vapours
4. Evaporation of water

- (a) 1 and 3
- (b) Only 2
- (c) Only 3

- (d) 2 and 4
45. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?
- Lead sulphate (insoluble)
 - Lead acetate
 - Ammonium nitrate
 - Potassium sulphate
46. Which of the following gases can be used for storage of fresh sample of an oil for a long time?
- Carbon dioxide or oxygen
 - Nitrogen or oxygen
 - Carbon dioxide or helium
 - Helium or nitrogen
47. The following reaction is used for the preparation of oxygen gas in the laboratory
- $$2\text{KClO}_3(\text{s}) \xrightarrow[\text{Catalyst}]{\text{Heat}} 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$$
- Which of the following statement(s) is(are) correct about the reaction?
- It is a decomposition reaction and endothermic in nature.
 - It is a combination reaction.
 - It is a decomposition reaction and accompanied by release of heat.
 - It is a photochemical decomposition reaction and exothermic in nature.
48. Which one of the following processes involve chemical reactions?
- Storing of oxygen gas under pressure in a gas cylinder
 - Liquefaction of air
 - Keeping petrol in a china dish in the open
 - Heating copper wire in presence of air at high temperature
49. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature?
- $2\text{H}_2(\text{l}) + \text{O}_2(\text{l}) \longrightarrow 2\text{H}_2\text{O}(\text{g})$
 - $2\text{H}_2(\text{g}) + \text{O}_2(\text{l}) \longrightarrow 2\text{H}_2\text{O}(\text{l})$
 - $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\text{l})$
 - $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\text{g})$
50. Which of the following are combination reaction?
- $2\text{KClO}_3 \xrightarrow{\text{Heat}} 2\text{KCl} + 3\text{O}_2$
 - $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$
 - $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$
 - $\text{Zn} + \text{FeSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Fe}$
- 1 and 3
 - 3 and 4
 - 2 and 4
 - 2 and 3
51. The addition of hydrogen to a substance is known as:
- Oxidation
 - Reduction
 - Redox reaction
 - Precipitation

- 52.** The oxidation of oils or fats in a food is known as:
- Corrosion
 - Rust
 - Rancidity
 - Oxidisation
- 53.** The necessary conditions for combustion process to occur are
- availability of air/oxygen.
 - availability of air/oxygen and fuel.
 - temperature of fuel below ignition temperature.
 - temperature of fuel above ignition temperature.
- Select the correct alternative.
- 1 and 2
 - 2 and 4
 - 3 and 1
 - 4 and 1
- 54.** The reaction between carbon and oxygen can be represented as
- $$\text{C(s)} + \text{O}_2\text{(g)} \xrightarrow{\Delta} \text{CO}_2\text{(g)} + \text{Heat}$$
- In which of the following type(s), the above reaction can be classified?
- Combustion reaction
 - Displacement reaction
 - Endothermic reaction
 - Combination reaction
- 1 and 3
 - 1, 3 and 4
 - 1 and 4
 - 1 Only
- 55.** Oxygen gas reacts with hydrogen to produce water. The reaction is represented by the equation:
- $$\text{O}_2\text{(g)} + \text{H}_2\text{(g)} \longrightarrow \text{H}_2\text{O(l)}$$
- The above reaction is an example of
- Oxidation of hydrogen
 - Reduction of oxygen
 - Reduction of hydrogen
 - Redox reaction
- 1, 2 and 3
 - 2, 3 and 4
 - 1, 3 and 4
 - 1, 2 and 4
- 56.** Compound *A* on strong heating in a boiling tube gives off reddish brown fumes and a yellow residue. When the aqueous solution of *A* is treated with few drops of sodium hydroxide solution, a white precipitate appeared. Identify the cation and anion present in the compound *A*.
- Copper(II) and nitrate
 - Lead(II) and chloride
 - Zinc and sulphate
 - Lead(II) and nitrate
- 57.** Magnesium ribbon is rubbed with sand paper before making it to burn. The reason of rubbing the ribbon is to:
- remove moisture condensed over the surface of ribbon.
 - generate heat due to exothermic reaction.
 - remove magnesium oxide formed over the surface of magnesium.
 - mix silicon from sand paper (silicon dioxide) with magnesium for lowering ignition temperature of the ribbon.

58. Which of the following is a feasible reaction?
- (a) $\text{Ba(s)} + \text{K}_2\text{SO}_4\text{(aq)} \longrightarrow \text{BaSO}_4\text{(aq)} + 2\text{K(s)}$
- (b) $\text{Zn(s)} + 2\text{AgNO}_3\text{(aq)} \longrightarrow \text{Zn(NO}_3)_2\text{(aq)} + 2\text{Ag(s)}$
- (c) $\text{Mg(s)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow \text{MgSO}_4\text{(aq)} + 2\text{Na(s)}$
- (d) $\text{Cu(s)} + \text{MgSO}_4\text{(aq)} \longrightarrow \text{CuSO}_4\text{(aq)} + \text{Mg(s)}$
59. The symbolic representation of an actual chemical change is known as
- (a) Chemical equation
- (b) Chemical formula
- (c) Chemical symbol
- (d) Physical formula
60. Which of the following chemical reaction is correct?
- (a) $2\text{Mg(s)} + \text{O}_2\text{(g)} \longrightarrow 2\text{MgO(s)}$
- (b) $2\text{Mg(s)} + \text{O}_2\text{(g)} \longrightarrow \text{MgO} + \text{O}_2$
- (c) $\text{Mg(s)} + \text{O}_2 \longrightarrow 2\text{MgO(s)}$
- (d) $2\text{Mg(s)} + 2\text{O}_2 \longrightarrow 2\text{MgO} + \text{O}_2$
61. $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
In the above reaction and products are:
- | | Reactants | Products |
|-----|--------------------------|---------------------------|
| (a) | N_2, H_2 | NH_3 |
| (b) | NH_3 | N_2, H_2 |
| (c) | N_2 | H_2, NH_3 |
| (d) | N_2NH_3 | H_2 |
62. An integer precedes the formula of each substance; is known as coefficients.
- (a) chemical
- (b) physical
- (c) stoichiometric
- (d) thermal
63. $2\text{Mg(s)} + \text{O}_2\text{(g)} \longrightarrow 2\text{MgO(s)}$
The stoichiometric coefficient of O_2 is:
- (a) 1
- (b) 2
- (c) 3
- (d) 4
64. The statement of law of conservation of mass is:
- (a) mass can neither be created nor destroy.
- (b) mass can be created nor destroy.
- (c) mass of the body cannot be remain same.
- (d) none of these.
65. Which of the following statement is correct regarding to chemical equation?
- (a) A chemical equation does not indicate about the condition for the reaction.
- (b) It gives the idea about the rate of reaction.
- (c) It gives the information about the heat.
- (d) It gives idea about the mechanism of the reaction.

66. Which one of the following is the decomposition reaction?

- (a) $\text{H}_2 + \text{Cl}_2 \xrightarrow{\text{Sunlight}} 2\text{HCl}$
 (b) $2\text{Mg} + \text{O}_2 \xrightarrow{\text{Heat}} 2\text{MgO}$
 (c) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2$
 (d) $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$

67. The oxidation and reduction takes place simultaneously in reaction.

- (a) displacement
 (b) redox
 (c) combination
 (d) decomposition

68. Which of the following is correct regarding the oxidizing agent?

- (a) It gives oxygen for oxidation.
 (b) It does not give oxygen for oxidation.
 (c) It does not remove hydrogen.
 (d) It gives oxygen and does not remove hydrogen.

69. $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$

Which of the following pair is correct regarding to oxidation and reduction?

	Oxidation	Reduction
(a)	CuO	H ₂
(b)	H ₂	CuO
(c)	H ₂ O	H ₂
(d)	H ₂	H ₂ O

70. Which of the following equation is

exothermic reaction?

- (a) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3 + \text{Heat}$
 (b) $\text{N}_2 + \text{O}_2 \longrightarrow 2\text{NO} - \text{Heat}$
 (c) $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$
 (d) $\text{Mg} + \text{Cl}_2 \longrightarrow \text{MgCl}_2$

71. Which of the following is the factor of influence the corrosion?

- (a) Reactivity of metals
 (b) Presence of impurities
 (c) Strain in the metal
 (d) All of the above

72. Which method is used for preventing corrosions?

- (a) Galvanization
 (b) Electroplating
 (c) Both (a) and (b)
 (d) Thermosetting

73. $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{XBaSO}_4 + \text{YHCl}$

The value of X and Y in the above chemical equation are:

- (a) 1, 2
 (b) 2, 1
 (c) 1, 1
 (d) 1, 3

74. The balancing chemical equation of following statement is:

“Silver bromide on exposure to sunlight decomposes into silver and bromine”.

- (a) $2\text{AgBr} \longrightarrow 2\text{Ag} + \text{Br}$

- (b) $2\text{AgBr} \xrightarrow{\text{Sunlight}} 2\text{Ag} + \text{Br}_2$
 (c) $2\text{AgBr} \xrightarrow{\text{Sunlight}} \text{Ag} + \text{Br}_2$
 (d) $\text{AgBr} \xrightarrow{\text{Sunlight}} \text{Ag} + 2\text{Br}$

75. The indication of chemical reaction in an activity is/are:

- (a) change in state
 (b) change in colour
 (c) change in temperature
 (d) all of the above

76. When potassium iodine solution is added to a solution of lead nitrate reaction occurs.

- (a) combination
 (b) decomposition
 (c) displacement
 (d) redox

77. $X + \text{Barium chloride} \longrightarrow \underset{\text{(White ppt)}}{Y} + \text{Sodium chloride}$

Here X and Y are:

- (a) NaSO_4 , BaSO_4
 (b) BaSO_4 , Na_2SO_4
 (c) BaSO_2 , NaSO_4
 (d) Na_2SO_4 , BaSO_4

78. Which of the following pair is incorrect?

	Reaction	Reaction Name
(a)	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	Combustion reaction and oxidation reaction
(b)	$\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$	Double displacement and precipitation reaction
(c)	$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$	Combination reaction
(d)	$\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$	Combination reaction

79. Which one reaction shows the property of double displacement reaction?

- (a) $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{ZnSO}_4 + \text{Cu}$
 (b) $\text{Cu} + 2\text{AgNO}_3 \longrightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 (c) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$
 (d) None of these

80. 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. Which type of chemical reaction take place in each step?

- (a) oxidation, redox
 (b) redox, oxidation
 (c) oxidation, oxidation

(d) redox, redox

81. Which one of the following pair is correct?

	Reaction	Reaction Type
(a)	$2\text{KNO}_3(\text{s}) \rightarrow 2\text{KNO}_2(\text{s}) + \text{O}_2(\text{g})$	Displacement reaction
(b)	$\text{Zn}(\text{s}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}(\text{s})$	Combination reaction
(c)	$\text{Ni}(\text{NO}_3)_2(\text{aq}) + 2\text{NaOH} \rightarrow \text{Ni}(\text{OH})_2 \downarrow + 2\text{NaNO}_3(\text{aq})$	Double displacement reaction and precipitation reaction
(d)	$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$	Decomposition reaction

82. $3\text{MnO}_2 + 4\text{Al} \rightarrow 3\text{Mn} + 2\text{Al}_2\text{O}_3$

The reducing agent in the above equation is:

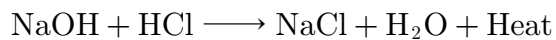
- (a) Al
 (b) Mn
 (c) C_2
 (d) Mn, O_2

83. Which of the following reaction represents the rusting of iron?

- (a) $\text{Fe}^{4+} \rightarrow \text{Fe}^{3+} + e^-$
 (b) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2 + \text{Heat}$
 (c) $4\text{Fe} + 3\text{O}_2 \xrightarrow{\text{Moisture}} 2\text{Fe}_2\text{O}_3$
 (d) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2 + \text{Heat}$

84. Which of the following reaction shows the change in colour?

- (a) $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 (b)



- (c) $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$
 (d) None of these.

85. Which reaction is used in photography?

- (a) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$
 (b) $2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
 (c) $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$
 (d) $2\text{AgBr} \xrightarrow{\text{sunlight}} 2\text{Ag} + \text{Br}$

86. Which metal have maximum reactivity?

- (a) K
 (b) Na
 (c) Au
 (d) Pt

87. The physical change is:

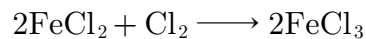
- (a) melting of butter
 (b) burning of paper
 (c) digestion of food
 (d) bursting of crackers

88. Which of the following is the chemical change?

- (a) burning of paper
 (b) boiling of water
 (c) breaking of glass
 (d) melting of butter

89. What happens when dilute hydrochloric acid is added to iron fillings?
- Hydrogen gas and iron chloride are produced.
 - Chlorine gas and iron hydroxide are produced.
 - No reaction takes place.
 - Iron salt and water are produced.
90. The reaction $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$ is an example of
- combination reaction
 - decomposition reaction
 - displacement reaction
 - double displacement reaction
91. Which of the following reactions involves the combination of two elements?
- $\text{CaO} + \text{CO}_2 \longrightarrow \text{CaCO}_3$
 - $4\text{Na} + \text{O}_2 \longrightarrow 2\text{Na}_2\text{O}$
 - $\text{SO}_2 + \frac{1}{2}\text{O}_2 \longrightarrow \text{SO}_3$
 - $\text{NH}_3 + \text{HCl} \longrightarrow \text{NH}_4\text{Cl}$
92. When lead nitrate is heated, it breaks down into lead monoxide, nitrogen dioxide and oxygen.
 $2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$
The reaction is an example of:
- Combination reaction
 - Decomposition reaction
 - Double displacement reaction
 - Displacement reaction
93. Which of the following is an example of displacement reaction?
- $\text{NaOH} + \text{HNO}_3 \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}$
 - $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 - $2\text{Hg} + \text{O}_2 \rightarrow 2\text{HgO}$
 - $\text{FeCl}_3 + 2\text{NaOH} \rightarrow 3\text{NaCl} + \text{Fe}(\text{OH})_3$
94. The reaction in which two compounds exchange their ions to form two new compounds is called:
- displacement reaction
 - decomposition reaction
 - isomerization reaction
 - metathesis reaction or double decomposition reaction
95. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of:
- combination reaction
 - displacement reaction
 - decomposition reaction
 - double displacement reaction
96. When the gases sulphur dioxide and hydrogen sulphide mix in the presence of water, the following reaction takes place:
 $\text{SO}_2 + 2\text{H}_2\text{S} \longrightarrow 2\text{H}_2\text{O} + 3\text{S}$
Here, hydrogen sulphide is acting as:
- an oxidizing agent
 - a reducing agent
 - a dehydrating agent
 - a catalyst

97. In the reaction:



Chlorine may be regarded as:

- an oxidizing agent
- a reducing agent
- a catalyst
- providing an inert medium

98. Which of the following is not a balanced equation?

- $\text{Ca}(\text{HO})_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
- $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$
- $\text{KClO}_4 \xrightarrow{\Delta} \text{KCl} + 2\text{O}_2$
- $\text{Cu} + 2\text{HNO}_3 \longrightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{NO}_2 + \text{H}_2\text{O}$

99. $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

- Combination reaction
- Double displacement reaction
- Decomposition reaction
- Displacement reaction

100. Which of the following are correctly matched?

1.	Dissolution	Solute gets dissolved in a solvent.
2.	Exothermic	Heat is absorbed.
3.	Reversible change	Reactants can be obtained.

Which of the above are correct?

- 1 and 2
- 2 and 3
- 1 and 3
- 1, 2 and 3

101. Which of the following is correct for a physical change?

- Only physical properties change.
- Large amount of heat is absorbed or evolved.

Which of the above statements is/are correct?

- Only 1
- Only 2
- Both 1 and 2
- Neither 1 and 2

102. Which of the following is not a chemical change?

- Burning of a candle.
- Cooking a food
- Sublimation
- Germination of seeds

103. Rusting of iron can be prevented by:

- Painting
- Galvanisation
- Electrolytic refining
- Alloying

Which of the above are correct?

- 1, 2 and 3
- 1, 2 and 4
- 2, 3 and 4
- 1, 2, 3 and 4

104. Which of the following is the observations of the chemical reaction?

- Change in state
- Evolution of a gas

3. Change in colour
 4. Change in temperature
 (a) 1, 2 and 3
 (b) 1, 2 and 4
 (c) 1, 3 and 4
 (d) 1, 2, 3 and 4
- (a) 1 and 2
 (b) 2 and 3
 (c) 1 and 3
 (d) 1, 2 and 3

105. Which of the following are correctly matched?

1. Reactant substance which undergoes change.
 2. Product new substance.
 3. Chemical reaction simplest form.
- (a) 1 and 2
 (b) 2 and 3
 (c) 1 and 3
 (d) 1, 2 and 3

106. Which of the following is/are correct for a balanced chemical equation?

1. It is based on law of conservation of mass.
 2. The physical states makes the chemical reaction less informative.
- (a) Only 1
 (b) Only 2
 (c) Both 1 and 2
 (d) Neither 1 nor 2

107. Which of the following are correctly matched?

	Symbol	State
1.	Aq	soluble in alcohol
2.	l	liquid
3.	s	solid

108. Which of the following are correctly matched?

1.	Combination reaction	Formation of single product.
2.	Decomposition reaction	Break down of single, entity.
3.	Thermal decomposition	Heat is used.
4.	Displacement reaction	Based on reactivity series.

- (a) 1, 2 and 3
 (b) 1, 2 and 4
 (c) 1, 3 and 4
 (d) 1, 2, 3 and 4

109. Which of the statements about the reaction below are correct?



1. Lead is getting reduced.
 2. Carbon dioxide is getting oxidised.
 3. Carbon is getting oxidised.
 4. Lead oxide is getting reduced.
- (a) 1 and 2
 (b) 1 and 3
 (c) 1, 2 and 3
 (d) All the above

110. When hydrogen sulphide gas is passed through a blue solution of copper sulphate,

a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of-

- (a) a combination reaction
- (b) a displacement reaction
- (c) a decomposition reaction
- (d) a double decomposition reaction

111. What happens when copper rod is dipped in iron sulphate solution?

- (a) Copper displaces iron
- (b) Blue colour of copper sulphate solution is obtained
- (c) No reaction takes place
- (d) Reaction is exothermic

112. A student added dilute HCl to a test tube containing zinc granules and made following observations :

- (a) the zinc surface became dull and black
- (b) a gas evolved which burnt with a pop sound
- (c) the solution remained colourless
- (d) the solution becomes green in colour

113. A dilute solution of sodium carbonate was added to two test tubes - one containing dil HCl (A) and the other containing dilute NaOH(B). Which of the following was the correct observation?

- (a) A brown coloured gas liberated in test tube A.
- (b) A brown coloured gas liberated in test tube B.
- (c) A colourless gas liberated in test tube

A.

- (d) A colourless gas liberated in test tube B.

114. When the gases sulphur dioxide and hydrogen sulphide mix in the presence of water, the reaction is $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$.

Here hydrogen sulphide is acting as:

- (a) an oxidising agent
- (b) a reducing agent
- (c) a dehydrating agent
- (d) a catalyst

115. $\text{CuO} + \text{H}_2 \rightarrow \text{H}_2\text{O} + \text{Cu}$, reaction is an example of:

- (a) redox reaction
- (b) synthesis reaction
- (c) neutralisation
- (d) analysis reaction

116. $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above reaction is an example of a-

- (a) combination reaction
- (b) double displacement reaction
- (c) decomposition reaction
- (d) displacement reaction

117. When $\text{Ca}(\text{NO}_3)_2$ is heated, it gives CaO , $\text{NO}_2(\text{g})$ and $\text{O}_2(\text{g})$. The correct number of moles of $\text{Ca}(\text{NO}_3)_2$, CaO , $\text{NO}_2(\text{g})$ and $\text{O}_2(\text{g})$ are present in the reaction are respectively

- (a) 1, 2, 4, 1
- (b) 2, 2, 4, 1

- (c) 2, 1, 3, 2
 (d) 2, 2, 2, 1

118. Which of the following reaction is characterised by the yellow colour of product?

- (a) $2\text{Pb}_3\text{O}_4 \xrightarrow{\Delta} 6\text{PbO}(s) + \text{O}_2(g)$
 (b) $\text{Zn}(s) + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$
 (c) $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$
 (d) $2\text{KClO}_3 \xrightarrow{\Delta} 2\text{KCl} + 3\text{O}_2(g)$

119. Which one of the following involve a chemical reaction?

- (a) Heating magnesium wire in the presence of air at high temperature
 (b) Evaporation of water
 (c) Storing on nitrogen gas under pressure
 (d) Keeping petrol in a China dish in open

120. Ethane (C_2H_6) on complete combustion gave CO_2 and water. It shows that the results are in accordance with the law of conservation of mass. Then, the coefficient of oxygen is equal to

- (a) $7/2$
 (b) $3/2$
 (c) $5/2$
 (d) $9/2$

121. **Assertion :** Corrosion of iron is a serious problem.

Reason : Every year an enormous amount

of money is spent to replace damaged iron.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

122. **Assertion :** Changing of colour of copper from reddish brown to black is an example of reduction.

Reason : Hydrogen is removed.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

123. **Assertion :** When iron nail is dipped in copper sulphate solution, the iron nail becomes brownish in colour and the blue colour of copper solution fade.

Reason : Equation representing this change is



- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is

False.

- (d) Both Assertion and Reason are False.

124. Assertion : Silver chloride turns grey in sunlight.

Reason : Silver is one of the least reactive metals.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

125. Assertion : When water is added to calcium oxide, a large amount of heat is produced.

Reason : It is an endothermic reaction.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

126. Assertion : A chemical equation should be balanced.

Reason : Number of atoms of each element should be same on reactants as well as products side.

- (a) Both Assertion and Reason are True and Reason is the correct explanation

of the Assertion.

- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

127. Assertion : Chemical equations can be made more informative.

Reason : We can write physical state of reactants and products, temperature and pressure, name of catalyst used etc.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

128. Assertion : Equation

$C(s) + O_2(g) \longrightarrow CO_2(g)$ is an example of combination reaction.

Reason : In the given above equation, carbon and oxygen react to give carbon dioxide.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

129. Assertion : Chips manufacturers usually flush bags of chips with oxygen gas.

Reason : It adds taste to chips.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

130. Assertion : Precipitation reactions produce insoluble salts.

Reason : Precipitation reaction is a double decomposition reaction.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

131. Assertion : During digestion, carbohydrates are broken down to form glucose.

Reason : Glucose is necessary for breathing.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

132. Assertion : Decomposition reactions are similar to combination reactions.

Reason : Both reactions need a catalyst to occur.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

133. Assertion : Corrosion of iron is commonly known as rusting.

Reason : Corrosion of iron occurs in presence of water and air.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

134. Assertion : A reducing agent is a substance which can either accept electron.

Reason : A substance which helps in oxidation is known as reducing agent.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are

True but Reason is not the Correct explanation of the Assertion.

- (c) Assertion is True but the Reason is False.
- (d) Assertion (A) is false but reason (R) is true.

135. Assertion : The balancing of chemical equations is based on law of conservation of mass.

Reason : Total mass of reactants is equal to total mass of products.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

136. Assertion : Carbon dioxide turns lime water milky.

Reason : Carbon dioxide sullys the water.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

137. Assertion : A chemical reaction becomes

faster at higher temperatures.

Reason : At higher temperatures, molecular motion becomes more rapid.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

138. Assertion : The following chemical equation,
 $2C_6H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$

is a balanced chemical equation.

Reason : In a balanced chemical equation, the total number of atoms of each element may or may not equal on both side of the equation.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

139. Assertion : $Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe$
 The above chemical equation is an example of displacement reaction.

Reason : Aluminium being more reactive than iron, displaces Fe from its oxide.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are

True but Reason is not the Correct explanation of the Assertion.

- (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

140. Assertion : Photosynthesis is considered as an endothermic reaction.

Reason : Energy gets released in the process of photosynthesis.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

141. Assertion : In the following chemical equation,



Zinc is getting oxidised and copper oxide is getting reduced.

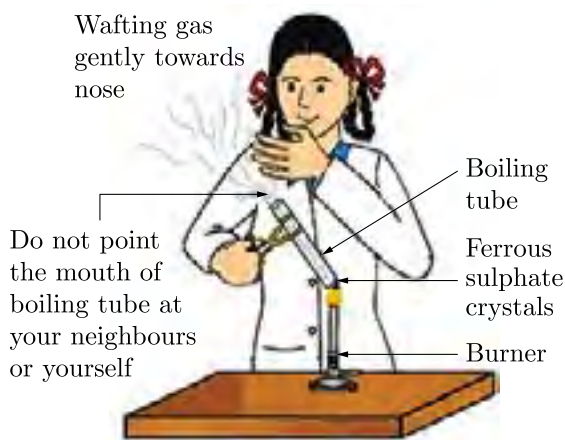
Reason : The process in which oxygen is added to a substance is called oxidation whereas the process in which oxygen is removed from a substance is called reduction.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 (c) Assertion is True but the Reason is False.
 (d) Both Assertion and Reason are False.

Sol : www.cbse.site/sc/am241

COMPETENCY BASED QUESTIONS

142. Sunita takes about 2 g ferrous sulphate crystals in dry boiling tube and heat the boiling tube over the flame of a burner or spirit lamp as shown in the figure.

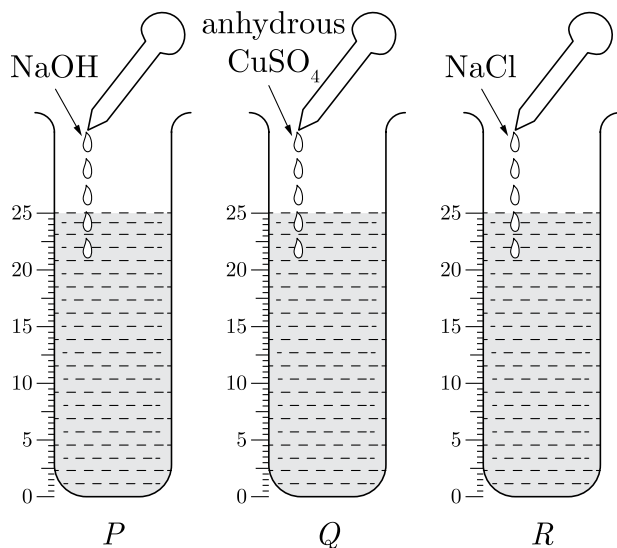


The colour of crystals after heating is:

- (a) Black
 (b) Brown
 (c) Green
 (d) Orange

143. Three beakers labelled as *P*, *Q* and *R* each containing 25 ml of water were taken. A small amount of NaOH, anhydrous CuSO_4 and NaCl were added to the beakers *P*, *Q* and *R* respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers *P* and *Q*, whereas in case of breaker *R*, the temperature of the solution falls. Which one of the following statements(s) is (are)

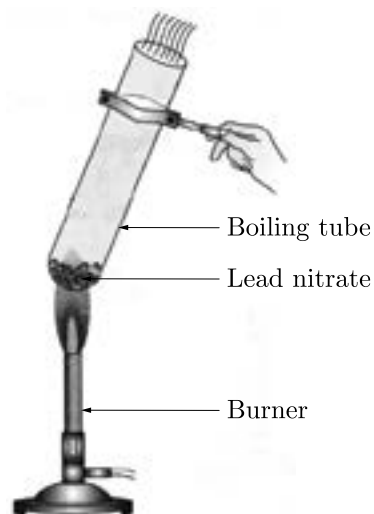
correct?



1. In beakers *P* and *Q*, exothermic process has occurred.
 2. In beakers *P* and *Q*, endothermic process has occurred.
 3. In beaker *R*, exothermic process has occurred.
 4. In beaker *R*, endothermic process has occurred.
- (a) Only 1
 (b) Only 2
 (c) 1 and 4
 (d) 2 and 3

144. Ramesh is science teacher in Kendriya Vidyalaya. He asked Sunita to perform following activity steps with lead nitrate powder.

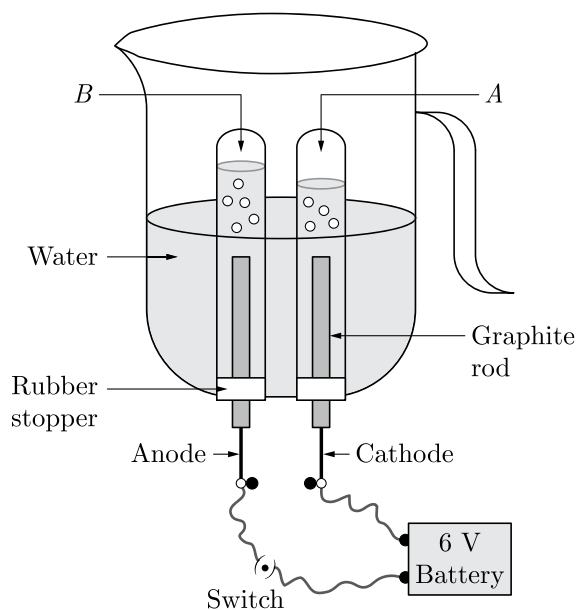
- Take about 2 g lead nitrate powder in a boiling tube.
- Hold the boiling tube with a pair of tongs and heat it over a flame as shown in figure.



Which of the following product is formed in the above process?

- (a) Lead oxide
- (b) Lead carbonate
- (c) Lead sulphide
- (d) Lead sulphide

145. A experimental arrangement of formation of gas is shown in the figure:

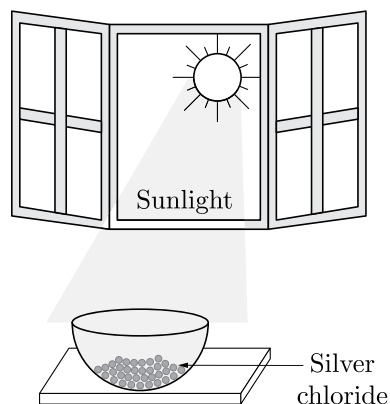


Which gas is present in tube *A*?

- (a) Oxygen

- (b) Hydrogen
- (c) Helium
- (d) Nitrogen

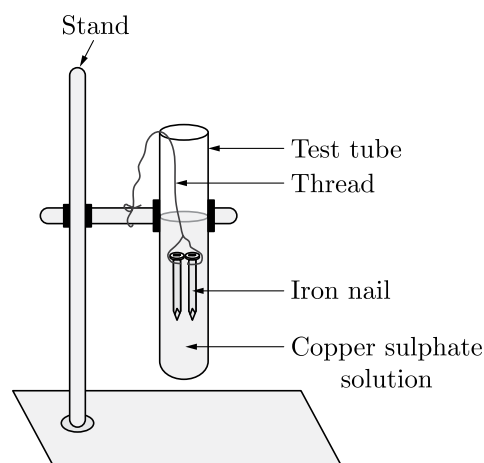
146. The silver chloride placed under the sunlight as shown in the figure:



The colour of silver chloride after some time is:

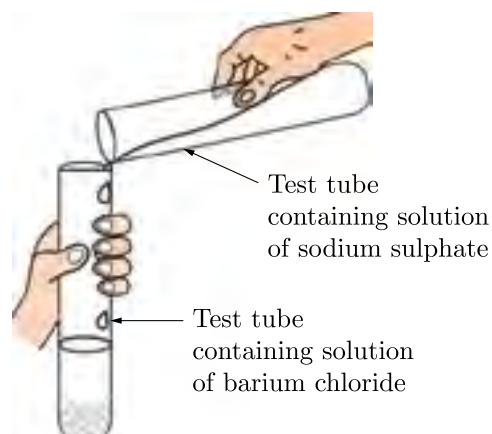
- (a) Black
 - (b) Green
 - (c) Gray
 - (d) Yellow
147. One day Mohan was performing an experiment in the laboratory. By mistake he leaves the iron nail in the copper sulphate

solution for one week.



After one week, the colour of sulphate solution is:

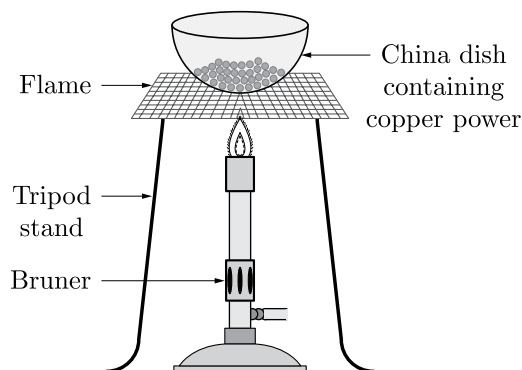
- (a) Green
 - (b) Yellow
 - (c) Red
 - (d) Colourless
148. Sodium sulphate and barium chloride mixed together as shown in the figure.



Which colour substance is formed in the test tube?

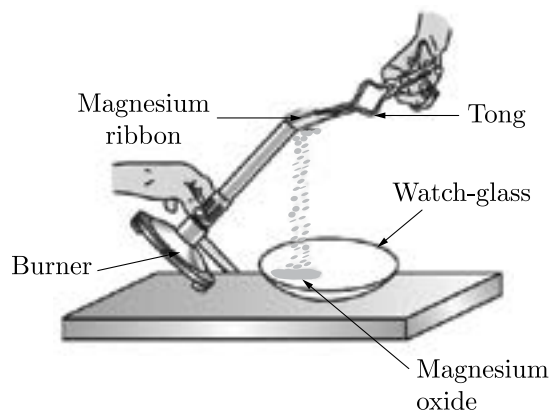
- (a) White
- (b) Black
- (c) Green
- (d) Yellow

149. A small amount of copper powder is heated as shown in the figure.



Which reaction shows the above process?

- (a) $2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}$
 (b) $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$
 (c) $\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}$
 (d) $\text{CuO} + \text{N}_2 \longrightarrow \text{Cu} + \text{N}_2\text{O}$
150. The reason of colour changing of silver anklet after few day is:
- (a) formation of silver sulphide.
 (b) formation of silver nitrate.
 (c) formation of silver chloride.
 (d) formation of silver bromide.
151. The science teacher ordered to Mohit done the following practical step with magnesium ribbon:
- Clean a magnesium ribbon about 3-4 cm long by rubbing it with sandpaper.
 - Hold it with a pair of tongs. Burn it using a spirit lamp or burner and collect the ash so formed in a watch-glass as shown in Figure. Burn the magnesium ribbon keeping it away as far as possible from your eyes.



Which of the following reaction is take place here?

- (a) $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$
 (b) $2\text{Mg} + \text{H}_2 \longrightarrow 2\text{MgH}$
 (c) $2\text{Mg} + \text{N}_2 \longrightarrow 2\text{MgN}$
 (d) $2\text{Mg} + \text{He}_2 \longrightarrow 2\text{MgHe}$

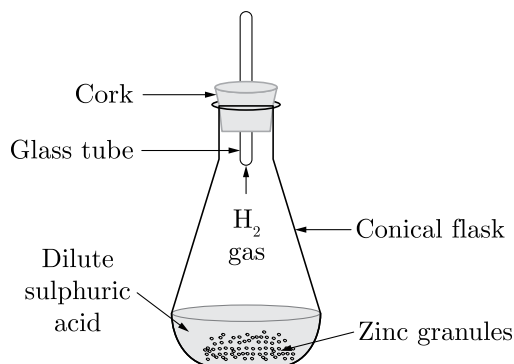
152. The science teacher said to Ram to perform a experiment with lead nitrate and potassium iodide. He done the following steps under the observation of our teacher.
- Take lead nitrate solution in a beaker.
 - Take potassium iodide solution in a test tube. (Both solutions are colourless).
 - Add potassium iodide solution slowly to the lead nitrate solution.

Which chemical reaction take place here?

- (a) $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \longrightarrow \text{PbI}_2 + 2\text{KNO}_3$
 (b) $\text{Pb}(\text{NO}_3)_2 + \text{KI} \longrightarrow \text{PbI}_2 + 2\text{NO}_3$
 (c) $\text{Pb}(\text{NO}_3)_2 + \text{I} \longrightarrow \text{PbI} + 2\text{K}$
 (d) $\text{Pb}(\text{NO}_3) + 2\text{KI} \longrightarrow 2\text{PbI}_2 + 2\text{KNO}_3$

153. One day Sunita went in the science lab and the take a few zinc granules in a conical flask or a test tube and add dilute hydrochloric

acid or sulphuric acid in it.



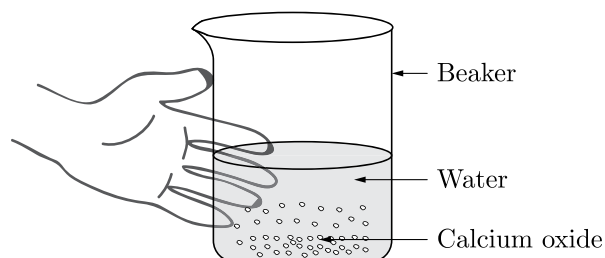
Which change is seen by Sunita in the above experimental process?

- Change in temperature
- Change in colour
- Evolution of gas
- Change in state

Direction For Questions (154-155)

Teacher asked Ganesh to do following experiment.

- Take a small amount of calcium oxide or quick lime in a beaker.
- Slowly add water to this.
- Touch the beaker as shown in Figure.



154. Which of the following reaction take place here?

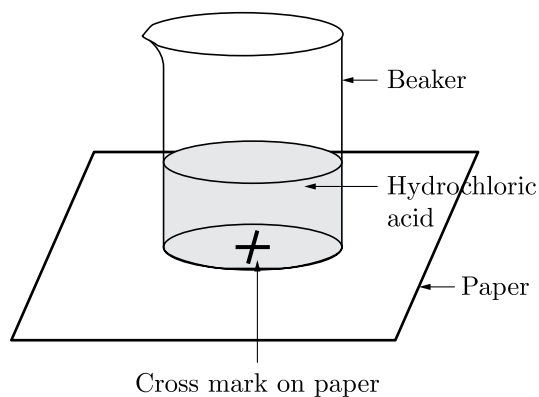
- $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$
- $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 - \text{Heat}$
- $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{CaH}_2 + \text{Heat}$
- $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2$

155. Which change is observed by Ganesh after touching the beaker?

- Change in temperature
- Change in the shape of beaker
- Change in the colour of water
- None of these

Direction For Questions (156-160)

In chemistry lab, a student took HCl in a beaker and was placed on a white paper with cross mark. When seen through the beaker the mark as shown in the figure was visible. On adding some sodium thiosulphate in the beaker the cross marked disappeared. When seen through the beaker. The student observed some reaction as the products formed were different than the reactants. Both the reactants were transparent.



156. Which of the following reaction is of similar type as observed in the given set up.

- $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq})$
- $2\text{FeSO}_4(\text{s}) \xrightarrow{\Delta} \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_2(\text{g})$

+ $\text{SO}_3(\text{g})$

- $\text{Fe}(\text{s}) + \text{CuSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq})$

+ $\text{Cu}(\text{s})$

- $\text{Na}_2\text{SO}_4(\text{aq}) + \text{BaCl}_2(\text{aq}) \rightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$

(c) SO_3 (d) O_2

157. Name the resultant insoluble substance formed in the flask.

- (a) Sulphur
- (b) Sodium sulphide
- (c) Sodium sulphate
- (d) Sodium carbonate

158. Which of the following reaction is done in the above arrangement?

- (a) Double displacement reaction
- (b) Displacement reaction
- (c) Precipitation reaction
- (d) Redox reaction

159. Why did the cross mark disappear?

- (a) The solution so formed has ability to absorb black colour hence black coloured cross is not seen.
- (b) The resultant solution has high viscosity due to which it refracts the light to other angle.
- (c) The resultant solution is dark coloured which does not allow the light to pass through it.
- (d) The insoluble precipitate that is formed in the flask does not allow the light to pass through it to see the cross mark.

160. Which of the following gas is formed in above reaction?

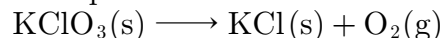
- (a) Cl_2
- (b) SO_2

Direction For Questions (161-162)

A reaction in which a single reactant breaks down to form two or more products is known as decomposition reaction. Decomposition reaction is just the opposite of combination reaction.

The decomposition reaction takes place only when the energy in the form of heat, electricity or light is supplied.

Oxygen is prepared by catalytic decomposition of potassium chlorate (KClO_3). Decomposition of potassium chlorate gives potassium chloride (KCl) and oxygen (O_2). The following reaction takes place :



161. How many moles of KClO_3 are required to produce 2.4 moles of O_2 ?

- (a) 1.6
- (b) 2.9
- (c) 1.9
- (d) 2.4

162. Which of following element is reduced in the given reaction?

- (a) Oxygen
- (b) Potassium
- (c) Chlorine
- (d) None of these

Direction For Questions (163-164)

Corrosion is the phenomenon of

deterioration of surface of metal in presence of air and moisture. It is a natural process and in the presence of a moist atmosphere, chemically active metals get corroded. This is oxidation reaction. Rusting is the process where iron corrodes due to exposure to the atmosphere. The main circumstance of corrosion occurs with iron because it is a structural material in construction, bridges, buildings, rail transport, ships, etc. Aluminium is also an important structural metal, but even aluminium undergoes oxidation reactions. However, aluminium doesn't corrode or oxidise as rapidly as its reactivity suggests. An alloy of aluminium or any other metal like magnesium can make aluminium stronger and harder. Copper (Cu) corrodes and forms a basic green carbonate and lead corrodes to form a white lead oxide or carbonate.

163. Which two metals do not corrode easily?

- (a) Gold
- (b) Copper
- (c) Platinum
- (d) Both (a) and (b)

164. Select the incorrect statement from the following options :

- (a) Replace of corroded equipment is time consuming.
- (b) Corrosion is a type of oxidation reaction.
- (c) Corrosion increases the electrical conductivity of metals.
- (d) Corrosion causes leakage of toxic liquid or gases.

Any process which involves addition of oxygen (or non-metallic element) or removal of hydrogen (or metallic element) or loss of electron(s) from an atom or an ion is called oxidation reaction. The substance which can bring about oxidation of other substances is called oxidising agent.

Any process which involves addition of hydrogen (or metallic element) or removal of oxygen (or non-metallic element) or gain of electrons(s) by atom an or ion is called reduction reaction.

The substance which can bring about reduction of other substances is called a reducing agent.

Oxidation and reduction always take place together and these type of reactions are known as redox reactions. Some of the examples of redox reactions are given below:

- a. $\text{Pb}_3\text{O}_4 + 8\text{HCl} \rightarrow 3\text{PbCl}_2 + \text{Cl}_2 + 4\text{H}_2\text{O}$
- b. $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$
- c. $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{Cu} + \text{ZnSO}_4$
- d. $\text{V}_2\text{O}_5 + 5\text{Ca} \longrightarrow 2\text{V} + 5\text{CaO}$
- e. $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
- f. $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$

165. Which of the following is the example of oxidation reaction from your everyday life?

- (a) Corrosion
- (b) Rancidity
- (c) Electricity in batteries
- (d) Both (a) and (b)

166. The oxidising agent in the reaction *c* and *f* are:

- (a) CuSO_4 and CuO
- (b) CuO and CuSO_4
- (c) Zn and CuO
- (d) CuO and Zn

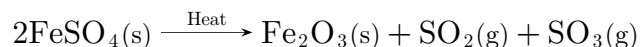
Direction For Questions (165-168)

167. Which of the following is an oxidising agent?

- (a) LiAlH_4
- (b) Alkaline KMnO_4
- (c) Acidified $\text{K}_2\text{Cr}_2\text{O}_7$
- (d) Both (b) and (c)

168. A reaction in which a single reactant breaks down to form two or more products is known as decomposition reaction. Decomposition reaction is just the opposite of combination reaction. The decomposition reaction takes place only when the energy in the form of heat, electricity or light is supplied.

Example: Ferrous sulphate crystals on heating in a dry boiling tube gives the following reaction:



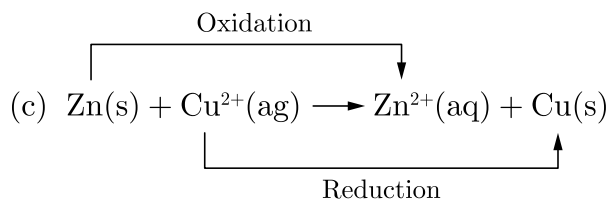
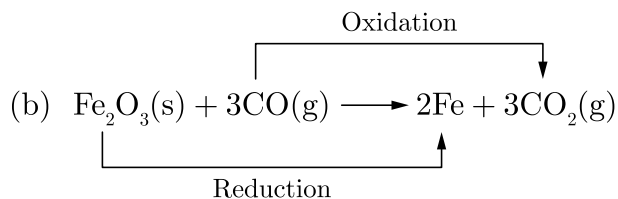
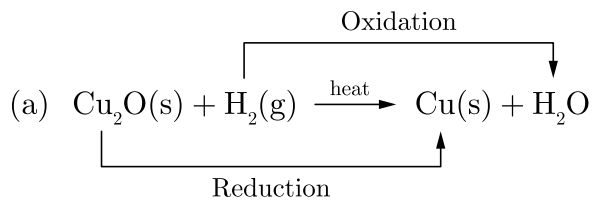
Which of the following gas has a smell of burning sulphur?

- (a) Sulphur oxide
- (b) Sulphur dioxide
- (c) Sulphur chloride
- (d) None of these

Direction For Questions (169-171)

Chemical reactions where oxidation and reduction both take place simultaneously are called redox reactions. In the word, 'REDOX' 'RED' stands for reduction and 'OX' stands for oxidation.

Examples:



Redox reactions play a vital role in our daily life. Generation of electricity in batteries, production of heat energy by burning chemical substances, extraction of metals, manufacture of a number of useful products are common examples of redox reactions.

169. Which of the following are the reducing agent in (a) and (c)?

- (a) H_2 , Zn
- (b) Zn, H_2
- (c) Cu, H_2
- (d) H_2 , Cu

170. Which of the following is not a example of redox reaction?

- (a) $\text{CO}_2 + \text{H}_2 \rightarrow \text{CO} + \text{H}_2\text{O}$
- (b) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{ZnSO}_4$
- (c) $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
- (d) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

171. The other name of displacement reaction is:

- (a) Decomposition reaction
- (b) Combination reaction
- (c) Displacement reaction
- (d) None of these

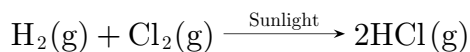
172. Magnesium ribbon burns in air with a dazzling white flame. This is due to the formation of a white solid. This white solid dissolves in water and gives a solution which turns red litmus blue.

Which type of reaction is performed in above process?

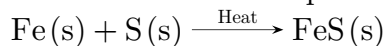
- (a) Combination reaction
- (b) Decomposition reaction
- (c) Redox reaction
- (d) Oxidation reaction

173. A reaction in which two or more reactants combine to form a single product is called combination reaction. In combination reactions following three cases are observed: Combination of two elements: Two elements combine to form a new compound. Some examples are:

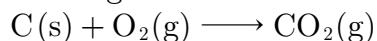
Combination of hydrogen and chlorine:



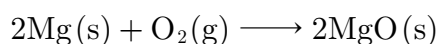
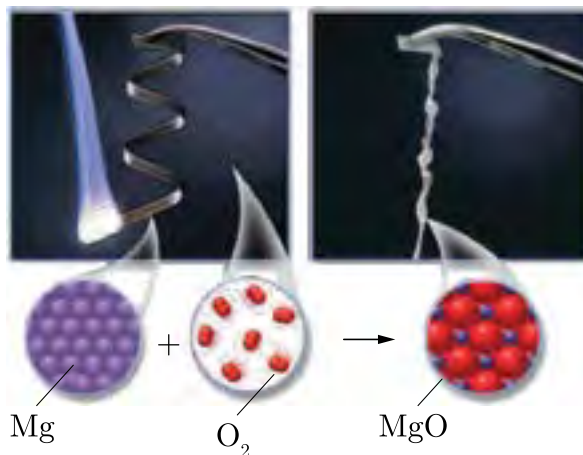
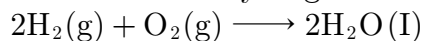
Formation of iron sulphide:



Burning of coal:



Combustion of hydrogen:



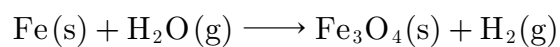
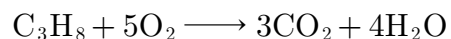
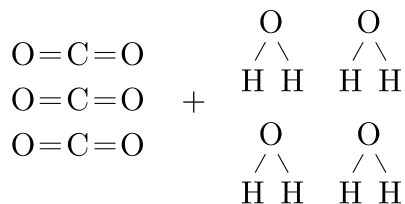
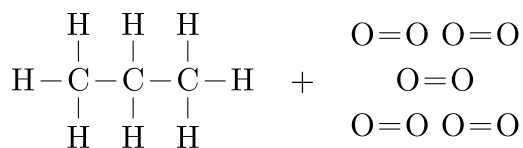
Which of the following is not a combination reaction?

- (a) $\text{NH}_3 + \text{HCl} \longrightarrow \text{NH}_4\text{Cl}$
- (b) $2\text{NO} + \text{O}_2 \longrightarrow 2\text{NO}_2$
- (c) $2\text{SO}_2 + \text{O}_2 \longrightarrow 2\text{SO}_3$
- (d) $\text{Cu}_2\text{O} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$

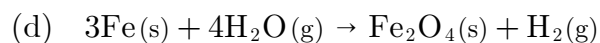
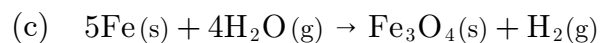
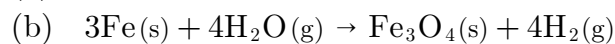
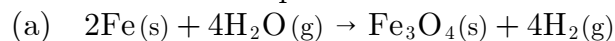
174. A balanced chemical equation is one which contains an equal number of atoms of each element on both the sides of the equation. An unbalanced chemical equation is one in which the number of atoms of the elements on the two sides of the equation is not the same. An unbalanced chemical equation is also called skeletal chemical equation.

$\text{Kl} + \text{Cl}_2 \rightarrow \text{KCl} + \text{l}_2$ (Unbalanced chemical equation).

$2\text{Kl} + \text{Cl}_2 \rightarrow 2\text{KCl} + \text{l}_2$ (Balanced chemical equation).



The balanced chemical equation of above skeletal chemical equation is:



□□□□□□