

CBSE Class 10 Science

NCERT Solution

Science Chapter 1 - Chemical Reactions and Equations

In text Questions

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Question 1:- Why should a magnesium ribbon be cleaned before burning in air?

Answer

Magnesium gets covered with a layer of magnesium oxide when kept in air for a long time. This layer hinders the burning of magnesium. Hence, it is to be cleaned before burning.

Question 2:- Write the balanced equation for the following chemical reactions.

(i) Hydrogen + Chlorine \rightarrow Hydrogen chloride

(ii) Barium chloride + Aluminium sulphate \rightarrow Barium sulphate + Aluminium chloride

(iii) Sodium + Water \rightarrow Sodium hydroxide + Hydrogen

Answer:

(i) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$

(ii) $3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow \text{BaSO}_4 + 2\text{AlCl}_3$

(iii) $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2\uparrow$

Question 3:-Write a balanced chemical equation with state symbols for the following reactions :

(i) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.

(ii) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.

Answer:

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

(ii) $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$

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Question 1:-A solution of a substance 'X' is used for white washing.

(i) Name the substance 'X' and write its formula.

(ii) Write the reaction of the substance 'X' named in (i) above with water.

Answer:

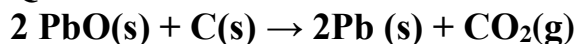
(i) The substance whose solution in water is used for white washing is calcium oxide (or quick lime). Its

NCERT Solutions Class 10 Science

Science Chapter 1- Chemical Reactions and Equations

Textbook Chapter End Questions

Question 1:-Which of the statements about the reaction below are incorrect?



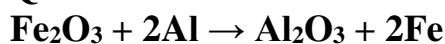
- (a) Lead is getting reduced.
 - (b) Carbon dioxide is getting oxidised.
 - (c) Carbon is getting oxidised.
 - (d) Lead oxide is getting reduced.
- (i) (a) and (b)
(ii) (a) and (c)
(iii) (a), (b) and (c)
(iv) All

Answer:

- (i) (a) and (b)

Explanation: (a) because Oxygen is being removed and (b) because the removed oxygen from Lead is added to the elemental Carbon.

Question 2



The above reaction is an example of a

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

Answer:

- (d) Displacement reaction.

Explanation: The Oxygen from the Ferrous oxide is getting displaced to the Aluminium metal to form Aluminium Oxide. In this reaction Aluminum is more reactive metal than Fe. Therefore Al will displace Fe from its oxide. This type of chemical reactions in which one of the elements displace another is called displacement reaction. Here less reactive metal is displaced by more reactive metal. Since one-time displacement is occurring, therefore, it is called a single displacement reaction.

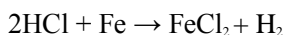
Question 3:-What happens when dilute hydrochloric acid is added to iron filings? Tick the correct answer :

- (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.

Answer

- (a) Hydrogen gas and iron chloride are produced.

Explanation: The Chlorine from Hydrogen chloride is displaced by the Iron fillings to undergo the following reaction.



Question 4:-What is a balanced chemical equation? Why should chemical equations be balanced?

Answer

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

The chemical equations should be balanced to satisfy the law of conservation of mass.

Question 5:-Translate the following statements into chemical equations and then balance them.

(a) Hydrogen gas combines with nitrogen to form ammonia.

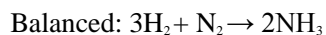
(b) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

(c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.

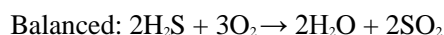
(d) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

Answer

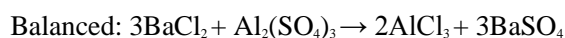
(a) Unbalanced: $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$



(b) Unbalanced: $\text{H}_2\text{S} + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{SO}_2$



(c) Unbalanced: $\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow \text{AlCl}_3 + \text{BaSO}_4$



(d) Unbalanced: $\text{K} + \text{H}_2\text{O} \rightarrow \text{KOH} + \text{H}_2$



Question 6:-Balance the following chemical equations :

(a) $\text{HNO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$

(b) $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

(c) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$

(d) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{HCl}$

Answer:

(a) $2\text{HNO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$

(b) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

(c) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$

(d) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$

Question 7:-Write the balanced chemical equations for the following reactions :

(a) Calcium hydroxide + Carbon dioxide \rightarrow Calcium carbonate + Water

(b) Zinc + Silver nitrate \rightarrow Zinc nitrate + Silver

(c) Aluminium + Copper chloride \rightarrow Aluminium chloride + Copper

(d) Barium chloride + Potassium sulphate \rightarrow Barium sulphate + Potassium chloride

Answer:

(a) $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

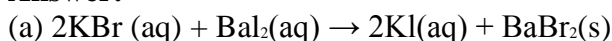
(b) $\text{Zn} + 2\text{AgNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$

- (c) $2\text{Al} + 3\text{CuCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{Cu}$
(d) $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{KCl}$

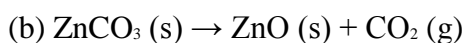
Question 8 :-Write the balanced chemical equation for the following and identify the type of reaction in each case :

- (a) **Potassium bromide (aq) + Barium iodide (aq) → Potassium iodide (aq) + Barium bromide(s)**
(b) **Zinc carbonate(s) → Zinc oxide (s) + Carbon dioxide (g)**
(c) **Hydrogen (g) + Chlorine (g) → Hydrogen chloride (g)**
(d) **Magnesium (s) + Hydrochloric acid (aq) → Magnesium chloride (aq) + Hydrogen (g)**

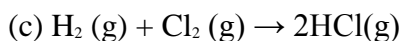
Answer:



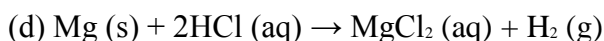
Type : Double displacement reaction



Type : Decomposition reaction



Type : Combination reaction



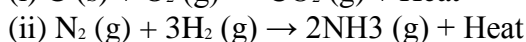
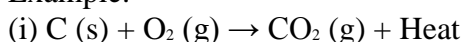
Type : Displacement reaction

Question 9:-What does one mean by exothermic and endothermic reactions? Give examples.

Answer

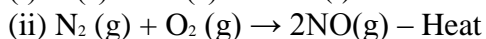
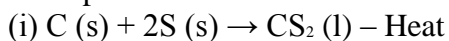
Exothermic reactions: Those reactions in which heat is evolved are known as exothermic reactions. An exothermic reaction is indicated by writing “+ Heat” on the products side of an equation.

Example:



Endothermic reactions: Those reactions in which heat is absorbed are known as endothermic reactions. An endothermic reaction is usually indicated by writing “Heat” on the product side of a chemical equation.

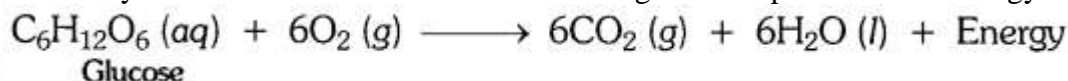
Examples:



Question 10:-Why is respiration considered an exothermic reaction? Explain.

Answer

Respiration is an exothermic process because during respiration glucose combines with oxygen in the cells of our body to form carbon dioxide and water along with the production of energy.

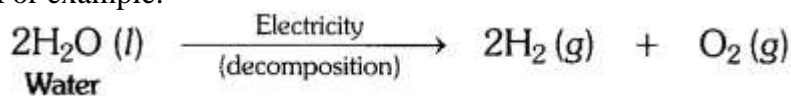


Question 11:-Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

Answer

In a decomposition reaction, a single compound breaks down to produce two or more simpler substances.

For example:



While, in a combination reaction, two or more substances simply combine to form a new substance.

For example:

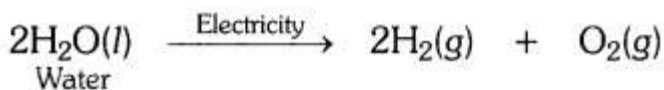
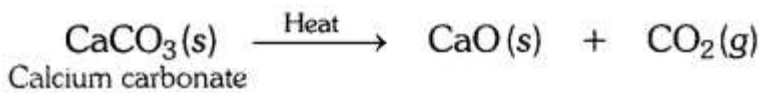


Question 12:-Write one equation each for the decomposition reactions where energy is supplied in the form of heat, light or electricity.

OR

Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity.

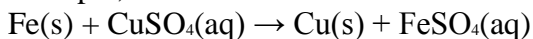
Answer:



Question 13:-What is the difference between displacement and double displacement reactions? Write equations for these reactions.

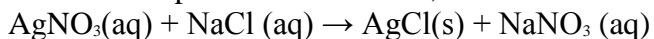
Answer

In displacement reactions, a more reactive metal displaces a less reactive metal from its solution. For example,



This is a displacement reaction where iron displaces copper from its solution.

In double displacement reactions, two reactants in solution exchange their ions. For example,



This is a double displacement reaction where silver nitrate and sodium chloride exchange Cl^- and NO_3^- ions between them.

Question 14:-In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.

Answer:



Question 15:-What do you mean by a precipitation reaction? Explain by giving examples.

Answer

A reaction in which an insoluble solid called precipitate is formed that separates from the solution is called a precipitation reaction.

Example: When a solution of iron (III) chloride and ammonium hydroxide are mixed, a brown precipitate of iron (III) hydroxide is formed.



Question 16:-Explain the following in terms of gain or loss of oxygen with two examples each:

(a) Oxidation and

(b) Reduction.

Answer

(a) Oxidation: The addition of oxygen to a substance is called oxidation.

Example:

(i) $\text{S}(s) + \text{O}_2(g) \rightarrow \text{SO}_2(g)$ (Addition of oxygen to sulphur)

(ii) $2\text{Mg}(s) + \text{O}_2(g) \rightarrow 2\text{MgO}(s)$ (Addition of oxygen to magnesium)

(b) Reduction: The removal of oxygen from a substance is called reduction.

Example: (i) $\text{CuO} + \text{H}_2 \xrightarrow{\text{Heat}} \text{Cu} + \text{H}_2\text{O}$

Here, copper oxide is being reduced to copper because oxygen gets removed from copper oxide.

(ii) $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$

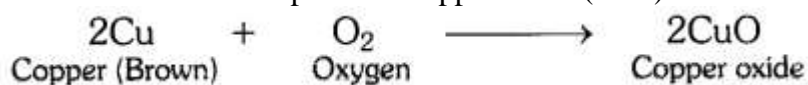
Here, zinc oxide is being reduced to zinc because oxygen gets removed from zinc oxide.

Question 17:-A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.

Answer

Element 'X' is copper (Cu).

The black coloured compound is copper oxide (CuO). The reaction involved is



Question 18:-Why do we apply paint on iron articles?

Answer

Paint does not allow iron articles to come in contact with air, water and saves iron articles from damage due to rusting.

Question 19:-Oil and fat containing food items are flushed with nitrogen. Why?

Answer

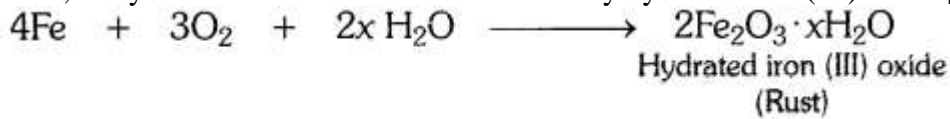
To keep food items fresh and save from getting oxidised, food items are flushed with nitrogen.

Question 20:-Explain the following terms with one example each (a) Corrosion, (b) Rancidity.

Answer

(a) Corrosion: It is the process in which metals are eaten up gradually by the action of air, moisture or a chemical (such as an acid) on their surface.

Example: When iron is exposed to moist air for a long period of time, its surface acquires a coating of a brown, flaky substance called rust. Rust is mainly hydrated iron (III) oxide [$\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$].



(b) Rancidity: The condition produced by aerial oxidation of fats and oils in foods marked by unpleasant smell and taste is called rancidity.

Rancidity spoils the food materials prepared in fats and oils which have been kept for a considerable time and makes them unfit for eating.

Rancidity can be prevented by adding anti-oxidants to foods containing fats and oils. It can also be prevented by flushing fat and oil containing foods with nitrogen before sealing.