CBSE Important Questions for Class 10 Science Chapter 1: CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations is an important chapter for students preparing for their board exams. This chapter focuses on understanding the different types of chemical reactions, including combination, decomposition, displacement and redox reactions.

By practicing these important questions, students can clarify their understanding of key concepts, such as identifying reactants and products, predicting reaction outcomes and recognizing the practical applications of chemical reactions in everyday life. Moreover, these questions help students become familiar with the exam pattern, improve their problem-solving skills and build confidence for the actual examination. Solving them thoroughly will ensure a strong grasp of the chapter and enhance overall performance in the subject.

CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations Overview

CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations have been prepared by subject experts of Physics Wallah.

By breaking down complex topics into simpler explanations the experts ensure that students can easily grasp the various types of chemical reactions, learn how to balance equations and apply the law of conservation of mass.

CBSE Important Questions for Class 10 Science Chapter 1 PDF

CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations are available in a PDF format.

By accessing the PDF students can easily navigate through the important questions and solutions allowing for focused study sessions. The PDF provides a structured approach to mastering chemical reactions and equations making it an invaluable resource for exam preparation. To access the PDF please refer to the link provided below.

CBSE Important Questions for Class 10 Science Chapter 1 PDF

CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations

Here we have provided CBSE Important Questions for Class 10 Science Chapter 1 Chemical Reactions and Equations-

Multiple Choice Type Questions

Q1. Which of the following gases is used to store fat and oil-containing foods for a long time?

1. Carbon dioxide
2. Oxygen
3. Nitrogen
4. Neon

Answer:

(3) Nitrogen gas is used to store fat and oil-containing foods for a long time. Nitrogen helps to prevent oxidation and spoilage, extending the shelf life of these products.

Q2. The chemical reaction between Hydrogen sulphide and iodine to give Hydrogen iodide and sulphur is given below:

$H_2S + I_2 \rightarrow 2HI + S$.

The reducing and oxidising agents involved in this redox reaction are:

1. Iodine and sulphur, respectively
2. Iodine and hydrogen sulphide, respectively
3. Sulphur and iodine, respectively
4. Hydrogen sulphide and sulphur, respectively

Answer:

(2) Iodine is the oxidizing agent, and hydrogen sulfide is the reducing agent in the reaction mentioned above.

In this reaction, iodine (I_2) gains electrons (is reduced) while hydrogen sulfide (H_2S) loses electrons (is oxidized), resulting in the formation of hydrogen iodide (HI) and sulfur (S).

Short Answer Type Questions

Q1. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.

(a)Nitrogen gas is treated with hydrogen gas in the presence of a catalyst at 773K to form ammonia gas.

(b)Sodium hydroxide solution is treated with acetic acid to form sodium acetate and water.

(c) Ethanol is warmed with ethanoic acid to form ethyl acetate in the presence of concentrated H_2SO_4.

(d) Ethene is burnt in the presence of oxygen to form carbon dioxide and water and releases heat and light.

Answer:

(a)

N2(g)+3H2(g)→Catalyst773K2NH3(g)

It is an addition reaction.

(b) $NaOH\ (aq) + CH_3COOH\ (aq) \rightarrow CH_3COONa\ (aq) + H_2O\ (l)$

It is a double displacement or a neutralisation reaction.

(c)

C2H5OH(l)+CH3OH(l)→H+CH3COOC2H5(l)+H2O(l)

It is a double displacement or an esterification reaction.

(d) $C_2H_4\,(g) + 3\ O_2\,(g) \rightarrow 2\ CO_2\,(g) + 2\ H_2O\ (g) + Heat + light$

It is a redox or a combustion reaction.

Q2. Write the balanced chemical equations for the following reactions and identify the type of

reaction in each case.

(a) In the thermite reaction, iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.

(b) Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.

(c) Chlorine gas is passed in an aqueous potassium iodide solution to form potassium

chloride solution and solid iodine.

(d) Ethanol is burnt in the air to form carbon dioxide and water and releases heat.

Answer:

(a) $Fe_2O_3\,(s) + 2\ Al\ (s) \rightarrow Al_2O_3\,(s) + 2\ Fe\ (l) + Heat$

It is a displacement or redox reaction.

(b) $3\ Mg\ (s) + N_2\ (g) \rightarrow Mg_3N_2\ (s)$

It is a combination reaction.

(c) $2\ KI\ (aq) + Cl_2\ (g) \rightarrow 2\ KCl\ (aq) + I_2\ (s)$

Q3. Complete the missing components / variables given as x and y in the following reactions

(a) $Pb(NO_3)_2\ (aq) + 2\ KI\ (aq) \rightarrow PbI_2\ (x) + 2\ KNO_3\ (y)$

(b) $Cu\ (s) + 2\ AgNO_3\ (aq) \rightarrow Cu(NO_3)_2\ (aq) + x(s)$

(c) $Zn\ (s) + H_2SO_4\ (aq) \rightarrow ZnSO_4\ (x) + H_2\ (y)$

(d)

CaCO3(s)→xCaO(s)+CO2(g)

Answer:

(a) $Pb(NO_3)_2\ (aq) + 2\ KI\ (aq) \rightarrow PbI_2\ (s) + 2\ KNO_3\ (aq)$

(b) $Cu\ (s) + 2\ AgNO_3\ (aq) \rightarrow Cu(NO_3)_2\ (aq) + 2\ Ag(s)$

(c) $Zn\ (s) + H_2SO_4\ (aq) \rightarrow ZnSO_4\ (aq) + H_2\ (g)$

(d)

CaCO3(s)→HeatCaO(s)+CO2(g)

Q4. Which among the following changes are exothermic or endothermic in nature?

(a) Decomposition of ferrous sulphate

(b) Dilution of sulphuric acid

(c) Dissolution of sodium hydroxide in water

(d) Dissolution of ammonium chloride in water

Answer:

(a) The **decomposition of ferrous sulfate** is an example of an **endothermic reaction** because heat is absorbed during this reaction.

(b) The **dilution of sulfuric acid** is an example of an **exothermic reaction** because heat is released during this process.

(c) The **dissolution of sodium hydroxide in water** is an example of an **exothermic reaction** because heat is released when sodium hydroxide dissolves.

(d) The **dissolution of ammonium chloride in water** is an example of an **endothermic reaction** because heat is absorbed during this process.

Q5. Identify the reducing agent in the following reactions

(a) $4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$

(b) $H_2O + F_2 \rightarrow HF + HOF$

(c) $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$

(d) $2\ H_2 + O_2 \rightarrow 2\ H_2O$

Answer:

(a) Here, ammonia (NH_3) is the reducing agent.

(b) Here, water (H_2O) is the reducing agent.

(c) Here, carbon monoxide (CO) is the reducing agent.

(d) Here, hydrogen (H_2) is the reducing agent.

Q6. Identify the oxidising agent (oxidant) in the following reactions

(a) $Pb_3O_4 + 8\ HCl \rightarrow 3\ PbCl_2 + Cl_2 + 4\ H_2O$

(b) $2\ Mg + O_2 \rightarrow 2\ MgO$

(c) $CuSO_4 + Zn \rightarrow Cu + ZnSO_4$

(d) $V_2O_5 + 5\ Ca \rightarrow 2\ V + 5\ CaO$

(e) $3\ Fe + 4\ H_2O \rightarrow Fe_3O_4 + 4\ H_2$

(f) $CuO + H_2 \rightarrow Cu + H_2O$

Answer:

(a) Pb_3O_4 is the oxidising agent here. The oxidation state of Pb in Pb_3O_4 reduces from + 6 to + 2 in $PbCl_2$. Thus it acts as an oxidising agent.

(b) O_2 is the oxidising agent here. The oxidation state of oxygen in elemental form O_2 reduces from 0 to – 2 in MgO. Thus it acts as an oxidising agent.

(c) $CuSO_4$ is the oxidising agent here. The oxidation state of Cu in $CuSO_4$ reduces from + 2 to 0 in Cu. Thus it acts as an oxidising agent.

(d) V_2O_5 is the oxidising agent here. The oxidation state of V in V_2O_5 reduces from + 5 to 0 in V. Thus, it acts as an oxidising agent.

(e) H_2O is the oxidising agent here. The oxidation state of oxygen in H_2O reduces from – 2 to – 3 in H_2O. Thus it acts as an oxidising agent.

(f) CuO is the oxidising agent here. The oxidation state of Cu in CuO reduces from + 2 to 0 in Cu. Thus, it acts as an oxidising agent.

Q7. Write the balanced chemical equations for the following reactions

(a) Sodium carbonate on reaction with hydrochloric acid in equal molar concentrations gives sodium chloride and sodium hydrogen carbonate.

(b) Sodium hydrogen carbonate on reaction with hydrochloric acid gives sodium chloride, water and liberates carbon dioxide.

(c) On treatment with potassium iodide, copper sulphate precipitates cuprous iodide (Cu_2I_2), liberates iodine gas and forms potassium sulphate.

Answer:

(a) $Na_2CO_3 + HCl \rightarrow NaCl + NaHCO_3$

(b) $NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

(c) $2\ CuSO_4 + 4\ KI \rightarrow Cu_2I_2 + 2\ K_2SO_4 + I_2$

Q8. A solution of potassium chloride, when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction?

Answer:

Chemical reaction: $KCl + AgNO_3 \rightarrow KNO_3 + AgCl$

It is a double displacement reaction.

Q9. Ferrous sulphate decomposes with the evolution of a gas having a characteristic dour of burning sulphur. Write the chemical reaction involved and identify the type of reaction.

Answer:

$FeSO_4\,(s) + Heat \rightarrow Fe_2O_3\,(s) + SO_2\,(g) + SO_3\,(g)$

It is a thermal decomposition reaction.

Q10. Why do fireflies glow at night?

Answer:

Fireflies glow at night because of a chemical reaction involving light's emission. Fireflies store a protein (luciferin) that combines with oxygen in the air to form a new substance (oxyluciferin) and the evolution of energy in light.

Q11. Grapes hanging on the plant do not ferment, but after being plucked from the plant can be fermented. Under what conditions do these grapes ferment? Is it a chemical or a physical change?

Answer:

When attached to the plant, grapes are living organisms, and their immune system prevents fermentation. However, after being plucked, the grapes can undergo fermentation due to the growth of microbes. This fermentation occurs under **anaerobic conditions**, meaning in the absence of oxygen. The process of fermentation transforms sugars in the grapes into alcohol and carbon dioxide. This transformation is classified as a **chemical change** because it results in the formation of new substances.

Q12. Which among the following are physical or chemical changes?

(a) Evaporation of petrol

(b) Burning of Liquefied Petroleum Gas (LPG)

(c) Heating of an iron rod to red hot.

(d) Curdling of milk

(e) Sublimation of solid ammonium chloride

Answer:

(a) **Evaporation of petrol** is a **physical change** because it only involves a change from liquid to gas without altering the chemical composition of the substance.

(b) **Burning of Liquefied Petroleum Gas (LPG)** is a **chemical change** since it produces new substances, namely carbon dioxide and water, through a combustion reaction.

(c) **Heating of an iron rod to red hot** is generally considered a **physical change** because it primarily involves a change in temperature and state (from solid to a glowing state) without altering the chemical identity of the iron.

(d) **Curdling of milk** is a **chemical change** as it alters the chemical composition of the milk, resulting in the formation of curds.

(e) **Sublimation of solid ammonium chloride** is also a **physical change** as it involves a change from solid to gas without any change in chemical composition.

Q13. We made the following observations during the reaction of some metals with dilute hydrochloric acid.

(a) Silver metal does not show any change

(b) The temperature of the reaction mixture rises when aluminium (Al) is added.

(c) The sodium metal reaction is highly explosive.

(d) Some gas bubbles are seen when lead (Pb) is reacted with the acid.

Explain these observations giving suitable reasons.

Answer:

(a) **Silver metal does not show any change:** Silver does not react with dilute hydrochloric acid because it is less reactive than hydrogen. In the reactivity series of metals, silver is positioned below hydrogen, meaning it cannot displace hydrogen ions from the acid. Therefore, no observable change occurs.

(b) **The temperature of the reaction mixture rises when aluminium (Al) is added:** The reaction between aluminium and hydrochloric acid is highly exothermic, meaning it releases a significant amount of heat. As aluminium reacts with the acid, the release of heat causes the temperature of the reaction mixture to increase.

(c) **The sodium metal reaction is highly explosive:** Sodium is an extremely reactive metal. When it comes into contact with dilute hydrochloric acid, it reacts vigorously to produce hydrogen gas and heat. The rapid production of hydrogen gas can lead to an explosive reaction, especially if the gas ignites due to the heat generated during the reaction.

(d) **Some gas bubbles are seen when lead (Pb) is reacted with the acid:** When lead reacts with dilute hydrochloric acid, hydrogen gas is produced. The gas bubbles observed during this reaction are due to the evolution of hydrogen gas.

$Pb\ (s) + 2\ HCl\ (aq) \rightarrow PbCl_2\ (s) + H_2\ (g)$

This equation shows that lead displaces hydrogen from the acid, resulting in the formation of lead(II) chloride and hydrogen gas.

Q14. A substance X, an oxide of a group 2 element, is used intensively in the cement industry. This element is present in bones also. On treatment with water, it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.

Answer:

Here, X is calcium oxide.

- Calcium oxide is used intensively in the cement industry.
- The element present in it (in bones also) is calcium.
- On treatment with water, calcium oxide forms a solution of calcium hydroxide [$Ca(OH)_2$], which is an alkali. Hence, it turns red litmus blue.

$CaO\ (s) + H_2O\ (l) \rightarrow Ca(OH)_2\ (aq) + Heat$

Q15. Write a balanced chemical equation for each following reaction and classify

them.

(a) Lead acetate solution is treated with dilute hydrochloric acid to form lead chloride and acetic acid solution.

(b) A piece of sodium metal is added to absolute ethanol to form sodium ethoxide and hydrogen gas.

(c) Iron (III) oxide on heating with carbon monoxide gas reacts to form solid iron and liberates carbon dioxide gas.

(d) Hydrogen sulphide gas reacts with oxygen gas to form solid sulphur and liquid water

Answer:

(a) $Pb(CH_3COO)_2 + 2\ HCl \rightarrow PbCl_2 + 2\ CH_3COOH$

It is a double displacement reaction.

(b) $2\ Na + 2\ C_2H_5OH \rightarrow 2\ C_2H_5ONa + H_2$

It is a displacement or a redox reaction.

(c) $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$

It is a redox reaction.

(d) $2\ H_2S + O_2 \rightarrow 2\ S + 2\ H_2O$

It is a redox reaction.

Q16. Why do we store silver chloride in dark coloured bottles?

Answer:

We store silver chloride in the dark-coloured bottles because silver chloride decomposes into silver and chlorine gas in sunlight.

Q17. Balance the following chemical equations and identify the type of chemical reaction.

(a) $Mg\ (s) + Cl_2\ (g) \rightarrow MgCl_2\ (s)$

(b) $HgO\ (s) + Heat \rightarrow Hg\ (l) + O_2\ (g)$

(c) $Na\ (s) + S\ (s) \rightarrow Na_2S\ (s)$

(d) $TlCl_4\ (l) + Mg\ (s) \rightarrow Tl\ (s) + MgCl_2\ (s)$

(e) $CaO\ (s) + SiO_2\ (s) \rightarrow CaSiO_3\ (s)$

(f) $H_2O_2\ (l) + UV \rightarrow H_2O\ (l) + O_2\ (g)$

Answer:

(a) $Mg\ (s) + Cl_2\ (g) \rightarrow MgCl_2\ (s)$

It is a combination reaction.

(b) $2\ HgO\ (s) + Heat \rightarrow 2\ Hg\ (l) + O_2\ (g)$

It is a thermal decomposition reaction.

(c) $2\ Na\ (s) + S\ (s) \rightarrow Na_2S\ (s)$

It is a combination reaction.

(d) $TlCl_4\ (l) + 2\ Mg\ (s) \rightarrow Tl\ (s) + 2\ MgCl_2\ (s)$

It is a displacement reaction.

(e) $CaO\ (s) + SiO_2\ (s) \rightarrow CaSiO_3\ (s)$

It is a combination reaction.

(f) $2\ H_2O_2\ (l) + UV \rightarrow 2\ H_2O\ (l) + O_2\ (g)$

It is a decomposition reaction.

Q18. A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by light emission. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y.

(a) Write the chemical formulae of X and Y.

(b) Write a balanced chemical equation when X is dissolved in water.

Answer:

Here, X is magnesium oxide, and Y is magnesium nitride.

(a) The chemical formulae of X are MgO and Y is Mg_3N_2.

(b) When X is dissolved in water following reaction occurs.

$MgO + H_2O \rightarrow Mg(OH)_2$

Q19. Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid whereas copper does not. Explain why?

Answer:

Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid, while copper does not. This difference is due to their positions in the activity series of metals. Zinc is more reactive than copper, as it is placed above hydrogen in the series.

Q20. A silver article generally turns black when kept in the open for a few days. The article, when rubbed with toothpaste again, starts shining.

(a) Why do silver articles turn black when kept in the open for a few days? Name the phenomenon involved.

(b) Name the black substance formed and give its chemical formula.

Answer:

(a) Silver articles turn black when exposed to the open air due to a reaction with sulfur compounds, such as hydrogen sulfide (H_2S), present in the atmosphere. This reaction leads to the formation of silver sulfide (Ag_2S). This phenomenon is known as corrosion or tarnishing of silver.

(b) The black substance formed is silver sulfide, and its chemical formula is Ag_2S.

Long Answer Type Questions

Q1. On heating blue coloured powder of copper (I) nitrate in a boiling tube, copper oxide

(black), oxygen gas, and a brown gas X is formed

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

(b) Identity the brown gas X evolved.

(c) Identify the type of reaction.

(d) What could be the pH range of the aqueous solution of the gas X?

Answer:

(a) $2\ CuNO_3\ (s) + Heat \rightarrow 2\ CuO\ (s) + 4\ NO_2\ (g) + O_2\ (g)$

(b) The brown gas is of nitrogen dioxide.

(c) It is a thermal decomposition reaction.

(d) NO_2 gas reacts with water to produce nitric acid. Thus, its pH range will be less than 7.

Q2. Give the characteristic tests for the following gases

(a) CO_2

(b) SO_2

(c) O_2

(d) H_2

Answer:

The characteristics test for

(a) CO_2: CO_2 turns lime water milky due to the formation of insoluble calcium carbonate.

$CO_2 + Ca(OH)_2 \rightarrow CaCO_3 + H_2O$

(b) SO_2: SO_2 turns purple coloured acidic potassium permanganate solution colourless.

$5\ SO_2 + 2\ KMnO_4 + 2\ H_2O \rightarrow K_2SO_4 + 2\ MnSO_4 + 2\ H_2SO_4$

(c) O_2: We can confirm the evolution of oxygen gas by bringing a burning candle near the mouth of the test tube containing the reaction mixture. The intensity of the flame increases because oxygen supports burning.

(d) H_2: Hydrogen (H_2) gas burns with a pop sound when a burning candle is brought near it.

Q3. What happens when a piece of

(a) Zinc metal is added to copper sulphate solution?

(b) Aluminium metal is added to dilute hydrochloric acid?

(c) Silver metal is added to copper sulphate solution?

Also, write the balanced chemical equation if the reaction occurs

Answer:

(a) Zinc metal reacts with copper sulphate solution and forms colourless zinc sulphate and reddish-brown copper metal.

$Zn\ (s) + CuSO_4\ (aq) \rightarrow ZnSO_4\ (aq) + Cu\ (s)$

(b) Aluminium metal reacts with dilute hydrochloric acid to form aluminium chloride and hydrogen gas.

$2\ Al\ (s) + 6\ HCl\ (aq) \rightarrow 2\ AlCl_3\ (aq) + 3\ H_2\ (g)$

(c) Silver is less reactive than copper. Hence, no reaction will occur.

Q4. When zinc granules are treated with a dilute solution of H_2SO_4, HCl, HNO_3, NaCl and NaOH. Write the chemical equations if a reaction occurs.

Answer:

- Zinc granules react with dilute sulphuric acid to form zinc sulphate and hydrogen gas.

$Zn\ (s) + H_2SO_4\ (aq) \rightarrow ZnSO_4\ (aq) + H_2\ (g)$

- Zinc granules react with dilute hydrochloric acid to form zinc chloride and hydrogen gas.

$Zn\ (s) + H_2SO_4\ (aq) \rightarrow ZnCl_2\ (aq) + H_2\ (g)$

- Zinc granules react with dilute nitric acid to form zinc nitrate, water and dinitrogen gas.

$Zn\ (s) + H_2SO_4\ (aq) \rightarrow Zn(NO_3)_2\ (aq) + H_2O\ (l) + N_2O\ (g)$

- Zinc does not react with sodium chloride

$Zn\ (s) + NaCl \rightarrow$ No Reaction.

- Zinc granules react with dilute sodium hydroxide to form zinc hydroxide and hydrogen gas.

$Zn\ (s) + NaOH\ (aq) \rightarrow Zn(OH)_2\ (aq) + Na\ (g)$

Q5. A white precipitate is obtained when adding a drop of barium chloride solution to an aqueous sodium sulphite solution.

(a) Write a balanced chemical equation of the reaction involved

(b) What other name can be given to this precipitation reaction?

(c) On adding dilute hydrochloric acid to the reaction mixture, white residue disappears. Why?

Answer:

(a) $BaCl_2 + Na_2SO_3 \rightarrow BaSO_3 + 2\ NaCl$

(b) It can be assigned as a double displacement reaction.

(c) On adding dilute hydrochloric acid to the reaction mixture, white residue disappears due to the formation of barium chloride.

$BaSO_3 + 2\ HCl \rightarrow BaCl_2 + SO_2 + H_2O$

Q6. You are provided with two containers made up of copper and aluminium. You are also

provided with dilute HCl, HNO_3, $ZnCl_2$ and H_2O solutions. In which of the above

containers we can keep these solutions?

Answer:

The solutions of dilute HCl, HNO_3, $ZnCl_2$, and H_2O can be stored in a container made of copper. Copper is a less reactive metal and is positioned below hydrogen in the reactivity series, so it does not react with these acids or salt solutions. In contrast, aluminum is a highly reactive metal that can react with these solutions, making it unsuitable for storing them. Therefore, a copper container is the appropriate choice for keeping the specified solutions.

Benefits of CBSE Important Questions for Class 10 Science Chapter 1

- **Focused Study**: These questions cover important concepts from the chapter, allowing students to focus on important topics that are likely to appear in exams.
- **Exam Preparation**: Practicing these questions helps students become familiar with the types of questions that may be asked in the board exam enhancing their readiness and confidence.
- **Clarification of Doubts**: Working through these important questions can help clarify doubts and reinforce understanding of chemical reactions and equations.
- **Improved Problem-Solving Skills**: By solving a variety of questions, students can develop better analytical and problem-solving skills which are important to secure good marks in board exams.
- **Enhanced Revision**: The questions are an excellent resource for revision helping students recap key concepts before the exam.