Important Questions for Class 11 Chemistry Chapter 7: Class 11 Chemistry Chapter 7 on Redox Reactions covers the fundamental concepts of oxidation and reduction, which are crucial in various chemical reactions. Key topics include the identification of oxidizing and reducing agents, balancing redox reactions using the half-reaction method, and understanding the concept of oxidation states.

Students also learn about electrochemical cells, including galvanic and electrolytic cells, and the process of electrolysis. Important questions often involve calculating oxidation states, identifying redox reactions, balancing reactions, and understanding the applications of redox processes in real-life scenarios like corrosion and electroplating. Understanding these concepts is essential for mastering the topic.

Important Questions for Class 11 Chemistry Chapter 7 Overview

Chapter 7 of Class 11 Chemistry, "Redox Reactions," is crucial as it lays the foundation for understanding various chemical processes that involve the transfer of electrons. Redox reactions are central to numerous biochemical processes, industrial applications, and environmental systems.

Key topics include oxidation and reduction, balancing redox reactions, and the concepts of oxidation states and their determination. Mastery of these concepts is essential for further studies in chemistry and applications such as electrochemistry, corrosion, and the functioning of batteries. Practicing important questions from this chapter helps build a strong understanding and problem-solving skills critical for exams and real-world scenarios.

Important Questions for Class 11 Chemistry Chapter 7 Redox Reactions

Below is the Important Questions for Class 11 Chemistry Chapter 7 Redox Reactions -

1. **Define oxidation reaction?**

Ans: A reaction in which oxygen gets added, or removal of a hydrogen atom takes place is called an oxidation reaction.

2. **Define reduction reaction?**

Ans: A reaction in which oxygen gets removed, or the addition of a hydrogen atom takes place is called an oxidation reaction.

3. In the reactions given below, identify the species undergoing oxidation and reduction

$H_2S(g) + Cl_2 \rightarrow 2HCl(g) + S(s)$

Ans: Chlorine, being an electronegative element, is added to hydrogen, so H_2S is oxidised. Hydrogen is added to chlorine, hence chlorine reduces while sulphur gets oxidized.

4. What are the most essential conditions that must be satisfied in a redox reaction?

Ans: A total number of electrons lost should be equal to the total number of electrons gained by the oxidising agent.

5. Define oxidation in terms of electron transfer.

Ans: Loss of electrons performed by the reducing agent is called oxidation. If the oxidation number of an element changes from 0 to +1, then it is said to be oxidised.

6. What is meant by reduction?

Ans: Gain of electrons performed by the oxidising agent is called oxidation. If the oxidation number of an element changes from 0 to -1, then it is said to be reduced.

7. Define an oxidizing agent. Name the best reducing agent.

Ans: A substance that can easily gain electrons is called an oxidising agent. Fluorine molecules are the best oxidising agent.

8. What is meant by reducing? Name the best reducing agent.

Ans: A substance that can easily lose electrons is called a reducing agent. Lithium is the best reducing agent.

9. What happens to the oxidation number of an element in oxidation?

Ans: Oxidation number increases during oxidation. If the oxidation number of an element changes from 0 to +1, then it is said to be oxidised.

10. Name the different types of redox reaction

Ans:

- Combination reactions
- Decomposition reactions
- Displacement reactions
- Disproportionation reactions

10. Define disproportionation reaction.

Ans: In a disproportionation reaction an element in one oxidation state is oxidized and reduced simultaneously.

11. All decomposition reactions are not redox reactions. Give a reason.

Ans: It is because in a decomposition reaction both the products or one of the two products should be in elemental form, so all decomposition reactions are not redox reactions. Example- Decomposition of calcium carbonate.

12. Complete the following redox reactions and balance the following equations-

(i) $Cr_2O_7{}^{2-} + C_2O_4{}^{2-} \rightarrow Cr^{3+} + CO_2$ **(in presence of acid)**

Ans: In presence of acid, H^+ ions are available. The reactions are:

$$Cr_2O_7{}^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$$

$$[C_2O_4{}^{2-} \rightarrow 2CO_2 + 2e^-] \times 3$$

We multiply the second equation by 3 so as to balance the number of electrons, and we get the final equation as:

$$Cr_2O_7{}^{2-} + 14H^+ + 3C_2O_4{}^{2-} \rightarrow 2Cr^{3+} + 6CO_2 + 7H_2O$$

(ii) $Sn^{2+} + Cr_2O_7{}^{2-} \rightarrow Sn^{4+} + Cr^{3+}$ **(in presence of acid)**

Ans: In presence of acid, H^+ ions are available. The reactions are:

$$Cr_2O_7{}^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$$

$$[Sn^{2+} \rightarrow Sn^{4+} + 2e^-] \times 3$$

We multiply the second equation by 3 so as to balance the number of electrons, and we get the final equation as:

$$Cr_2O_7{}^{2-} + 3Sn^{2+} + 14H^+ \rightarrow 2Cr^{3+} + 3Sn^{4+} + 7H_2O$$

13. Write correctly the balanced half-reaction and the overall equations for the following skeletal equations.

(i) $NO_3^- + Bi(s) \rightarrow Bi^{3+} + NO_2$ **(in acid solution)**

Ans:

(i) In acidic medium, H^+ is available.

The oxidation half is:

$$Bi(s) \rightarrow Bi^{3+} + 3e^-$$

The reduction half reaction:

$$[NO_3^- + 2H^+ + e^- \rightarrow NO_2 + H_2O] \times 3$$

The balanced equation is:

$$Bi(s) + 3NO_3^- + 6H^+ \rightarrow Bi^{3+} + 3NO_2 + 3H_2O$$

(ii) $Fe(OH)_2(s) + H_2O_2 \rightarrow Fe(OH)_3(s) + H_2O$ **(in basic medium)**

Ans: In a basic medium, OH^- is available.

The oxidation half is:

$$[Fe(OH)_2 + OH^- \rightarrow Fe(OH)_3 + e^-] \times 2$$

The reduction half is:

$$H_2O_2 + 2e^- \rightarrow 2OH^-$$

The balanced equation is:

$$2Fe(OH)_2 + H_2O_2 \rightarrow 2Fe(OH)_3$$

14. Define half–cell.

Ans: A half cell consists of conducting electrolyte and electrode structure, separated by a Helmholtz double layer.

15. What is the role of a salt bridge in an electrochemical cell?

Ans:

- Provide electrical neutrality
- Prevents the mixing of the electrolytes.

Benefits of Solving Important Questions for Class 11 Chemistry Chapter 7

Solving important questions for Class 11 Chemistry Chapter 7 on Redox Reactions can offer several benefits for students, especially in terms of understanding the topic and preparing for exams. Here are some key advantages:

1. **Deepens Understanding of Key Concepts**

Redox reactions are fundamental to understanding various chemical processes, including those in biology, industry, and the environment. By solving important questions, students can better grasp key concepts such as oxidation states, electron transfer, and balancing redox reactions.

2. **Improves Problem-Solving Skills**

Regular practice with a variety of problems enhances problem-solving abilities. Students learn to identify different types of redox reactions (disproportionation, combination, etc.) and develop strategies to balance them effectively.

3. **Helps Master Reaction Balancing**

One of the main challenges in redox reactions is balancing them correctly. Solving important questions provides students with practice in both the **half-reaction method** and the **oxidation-number method**, ensuring mastery over this critical skill.

4. **Increases Speed and Accuracy**

Familiarity with different question formats allows students to become quicker and more accurate. This is particularly beneficial during exams, where time management is crucial.

5. **Enhances Conceptual Clarity**

Important questions often highlight common misconceptions and tricky areas, enabling students to clarify doubts and reinforce their understanding of concepts like electron gain/loss, the role of oxidizing and reducing agents, and the significance of the **oxidation number**.