Chemical Reactions and Equations

Basic Concepts (Questions 1-5)

1. Define a chemical reaction and explain how it differs from a physical change.
2. What is a chemical equation? Write the chemical equation for the formation of water from hydrogen and oxygen.
3. Explain the law of conservation of mass with an example of a chemical reaction.
4. What do you understand by a balanced chemical equation? Why is it necessary to balance chemical equations?
5. Balance the following chemical equation: $Fe + O_2 \rightarrow Fe_2O_3$

Types of Chemical Reactions (Questions 6-12)

6. Define combination reaction with two examples from daily life.
7. What is a decomposition reaction? Give one example each of thermal, electrical, and photochemical decomposition.
8. Explain displacement reaction with an example. Why does zinc displace copper from copper sulfate solution?
9. What is a double displacement reaction? Write the chemical equation for the reaction between sodium chloride and silver nitrate.
10. Define oxidation and reduction in terms of gain and loss of oxygen. Give one example of each.
11. Identify the type of reaction: $CaCO_3 \rightarrow CaO + CO_2$ (on heating). Justify your answer.
12. What happens when magnesium ribbon burns in air? Write the balanced chemical equation and identify the type of reaction.

Advanced Concepts (Questions 13-17)

13. Explain oxidation and reduction in terms of electron transfer. Identify the oxidizing and reducing agents in the reaction: $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
14. What is rancidity? How can it be prevented? Explain the chemical process involved.
15. Why should a magnesium ribbon be cleaned before burning in air? What happens if it is not cleaned?
16. Explain why respiration is considered an oxidation reaction.
17. What is the difference between displacement and double displacement reactions? Give one example of each.

Application-Based Questions (Questions 18-20)

18. When you leave an iron nail in copper sulfate solution, what changes do you observe after some time? Write the chemical equation and explain the reaction.
19. Silver articles become black when exposed to air. Explain why this happens and write the chemical equation involved.
20. A solution of potassium chloride was added to a solution of silver nitrate. A white precipitate was formed. Name the white precipitate and write the balanced chemical equation for this reaction. What type of reaction is this?

These questions cover the complete syllabus ranging from basic definitions to application-based problems, helping students understand both theoretical concepts and practical applications of chemical reactions and equations.