## Worksheet: Chapter 1 – Chemical Reactions and Equations

**Class:** 10
**Subject:** Science
**Chapter:** 1 – Chemical Reactions and Equations
**Total Marks:** 40
**Time Allowed:** 90 minutes

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### Section A: Multiple Choice Questions (MCQs)

*(1 mark each)*

1. Which of the following is an example of a combination reaction?

   a) $CaCO_3 \rightarrow CaO + CO_2$

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

   c) $FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

   d) $Zn + HCl \rightarrow ZnCl_2 + H_2$

2. What is the balanced chemical equation for the reaction between zinc and sulphuric acid?

   a) $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

   b) $Zn + H_2SO_4 \rightarrow ZnSO_3 + H_2$

   c) $ZnSO_4 + H_2 \rightarrow Zn + H_2SO_4$

   d) $Zn + SO_2 \rightarrow ZnSO_4 + H_2$

3. Which of the following reactions is a displacement reaction?

   a) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

   b) $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$

c) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + NaCl$

d) $2Mg + O_2 \rightarrow 2MgO$

4. The reaction $CaO + H_2O \rightarrow Ca(OH)_2$ is an example of:

a) Decomposition reaction

b) Displacement reaction

c) Combination reaction

d) Redox reaction

5. Which of the following is a redox reaction?

a) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

b) $2H_2 + O_2 \rightarrow 2H_2O$

c) $CaCO_3 \rightarrow CaO + CO_2$

d) $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$

## Section B: Assertion-Reason Questions

*(1 mark each)*

6. **Assertion (A):** In a chemical reaction, atoms of one element do not change into atoms of another element.
   **Reason (R):** Chemical reactions involve the breaking and making of bonds between atoms.

   a) Both A and R are true, and R is the correct explanation of A.
   b) Both A and R are true, but R is not the correct explanation of A.
   c) A is true, but R is false.
   d) A is false, but R is true.

7. **Assertion (A):** Corrosion is an example of a redox reaction.
   **Reason (R):** In corrosion, iron combines with oxygen to form iron oxide, gaining oxygen.

   a) Both A and R are true, and R is the correct explanation of A.
   b) Both A and R are true, but R is not the correct explanation of A.
   c) A is true, but R is false.
   d) A is false, but R is true.

8. **Assertion (A):** A displacement reaction occurs when a more reactive metal displaces a less reactive metal from its compound.
   **Reason (R):** The reactivity series determines the displacement in a chemical reaction.

   a) Both A and R are true, and R is the correct explanation of A.
   b) Both A and R are true, but R is not the correct explanation of A.
   c) A is true, but R is false.
   d) A is false, but R is true.

9. **Assertion (A):** The decomposition of water into hydrogen and oxygen is an exothermic reaction.
   **Reason (R):** Decomposition reactions release energy in the form of heat.

   a) Both A and R are true, and R is the correct explanation of A.
   b) Both A and R are true, but R is not the correct explanation of A.
   c) A is true, but R is false.
   d) A is false, but R is true.

10. **Assertion (A):** Respiration is considered an exothermic process.
    **Reason (R):** Glucose is broken down in the presence of oxygen to produce energy.

    a) Both A and R are true, and R is the correct explanation of A.
    b) Both A and R are true, but R is not the correct explanation of A.
    c) A is true, but R is false.
    d) A is false, but R is true.

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## Section C: Short Answer Questions

*(2 marks each)*

11. Write the balanced chemical equation for the reaction between zinc and dilute hydrochloric acid. What type of reaction is it?
12. Define corrosion. Give an example of a metal that corrodes and mention how it affects daily life.
13. What is a precipitation reaction? Give an example and write the balanced chemical equation for it.
14. State the difference between a combination reaction and a decomposition reaction with one example each.
15. Why do chips manufacturers flush bags of chips with nitrogen? Explain the chemical concept behind it.

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## Section D: Long Answer Questions

*(3 marks each)*

16. Explain the process of balancing a chemical equation using the equation $Fe + H_2O \rightarrow Fe_3O_4 + H_2$ as an example.
17. What is the difference between exothermic and endothermic reactions? Give one example of each type of reaction.
18. Explain oxidation and reduction reactions. Provide one example of a redox reaction and identify the oxidized and reduced substances.
19. Explain the types of decomposition reactions with suitable examples. Also, mention the conditions required for these reactions to occur.
20. What is meant by displacement reaction? Explain with a balanced chemical equation how zinc displaces copper from copper sulphate solution.

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## Section E: Case Study Based Questions

*(4 marks each)*

**Case Study:**

Ravi was performing an experiment in his chemistry lab where he mixed lead nitrate solution with potassium iodide solution. He observed the formation of a yellow precipitate. The chemical reaction between these two solutions is known as a double displacement reaction.

21. Based on the above case study, answer the following questions:

a) What type of reaction is taking place in this experiment?
b) Write the balanced chemical equation for the reaction.
c) Why is the reaction called a double displacement reaction?
d) Identify the precipitate formed in this reaction.

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## Section F: Diagram Based Questions

*(5 marks each)*

22. Draw and explain the electrolytic decomposition of water. Write the chemical equation for the reaction. What are the products formed, and how can they be tested?

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