CHEMISTRY (NCERT)
CHAPTER 1 – CHEMICAL REACTIONS & EQUATIONS

A. MULTIPLE CHOICE QUESTIONS (MCQs)

1. A chemical equation is said to be balanced when:
(a) Number of atoms of each element is equal on both sides
(b) Total mass increases
(c) Products are more than reactants
(d) None of the above

2. Which of the following is a physical change?
(a) Rusting of iron
(b) Digestion of food
(c) Melting of ice
(d) Burning of magnesium ribbon

3. The chemical formula of quicklime is:
(a) $Ca(OH)_2$
(b) $CaCO_3$
(c) CaO
(d) $CaCl_2$

4. Which gas is formed when zinc reacts with dilute HCl?
(a) CO_2
(b) H_2
(c) O_2
(d) Cl_2

5. The process of gaining oxygen is called:
(a) Reduction
(b) Oxidation
(c) Neutralisation
(d) Decomposition

6. Rust is chemically:
(a) $Fe_2O_3 \cdot xH_2O$
(b) FeO
(c) $Fe(OH)_3$
(d) $FeCl_3$

7. Which of the following is a displacement reaction?
(a) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
(b) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

(c) $2H_2O_2 \rightarrow 2H_2O + O_2$
(d) $CaO + H_2O \rightarrow Ca(OH)_2$

8. Which reaction produces heat?
(a) Endothermic
(b) Exothermic
(c) Neutral
(d) None

9. A white precipitate is formed when $AgNO_3$ reacts with NaCl because:
(a) AgCl is soluble
(b) $NaNO_3$ is insoluble
(c) AgCl is insoluble
(d) $AgNO_3$ is insoluble

10. The chemical equation that represents a combination reaction:
(a) $CaO + H_2O \rightarrow Ca(OH)_2$
(b) $Zn + HCl \rightarrow ZnCl_2 + H_2$
(c) $AB \rightarrow A + B$
(d) $AgNO_3 + NaI \rightarrow AgI + NaNO_3$

11. Which is NOT a type of chemical reaction?
(a) Combination
(b) Decomposition
(c) Displacement
(d) Evaporation

12. Which of the following changes indicates a chemical reaction?
(a) Change in colour
(b) Formation of gas
(c) Change in temperature
(d) All of the above

13. Corrosion can be prevented by:
(a) Painting
(b) Galvanisation
(c) Alloying
(d) All of the above

14. Electrolysis of water gives:
(a) H_2 and CO_2
(b) H_2 and O_2
(c) CO and O_2
(d) H_2 and N_2

15. Which of the following is a decomposition reaction?
(a) $CaCO_3 \rightarrow CaO + CO_2$
(b) $2Mg + O_2 \rightarrow 2MgO$
(c) $Zn + S \rightarrow ZnS$
(d) $Mg + 2HCl \rightarrow MgCl_2 + H_2$

16. Redox reaction involves:
(a) Only reduction
(b) Only oxidation
(c) Both oxidation and reduction
(d) None

17. The brown fumes observed in thermal decomposition of lead nitrate are of:
(a) NO_2
(b) CO_2
(c) SO_2
(d) HCl

18. When copper is heated in air, the product formed is:
(a) CuO (black)
(b) Cu_2O (red)
(c) $CuSO_4$
(d) $CuCl_2$

19. Which of the following is necessary to balance a chemical equation?
(a) Formula change
(b) Altering subscripts
(c) Using correct coefficients
(d) Removing reactants

20. The reaction $2H_2 + O_2 \rightarrow 2H_2O$ is:
(a) Combination
(b) Decomposition
(c) Displacement
(d) Redox

B. ASSERTION–REASON QUESTIONS

21. Assertion (A): Magnesium ribbon is cleaned before burning.
Reason (R): The oxide layer on it prevents complete burning.

22. A: A balanced equation follows the law of conservation of mass.
R: Atoms are neither created nor destroyed in a chemical reaction.

23. A: Rusting is an oxidation reaction.
R: During rusting, iron gains oxygen.

24. A: Displacement reactions occur because some elements are more reactive.
R: A more reactive metal displaces a less reactive metal from its salt.

25. A: Photosynthesis is a chemical reaction.
R: It involves only a physical change.

26. A: Decomposition reactions require energy.
R: They can be thermal, electrolysis or photolytic.

27. A: Precipitation occurs when two aqueous solutions react.
R: The product formed is insoluble in water.

28. A: Corrosion of iron happens faster in humid conditions.
R: Presence of moisture accelerates oxidation.

29. A: All redox reactions involve electron transfer.
R: Reduction means gain of oxygen.

30. A: Burning of fuel is an exothermic reaction.
R: Heat is released in this reaction.

31. A: Neutralisation is a type of chemical reaction.
R: It always forms an insoluble salt.

32. A: Colour change during a reaction indicates chemical change.
R: Colour change always means a new substance is formed.

C. SHORT ANSWER QUESTIONS

33. What is a chemical reaction? Mention any two indicators that a chemical reaction has occurred.

34. What is a balanced chemical equation? Why must chemical equations be balanced?

35. Define oxidation and reduction with suitable examples.

36. What is corrosion? Explain why rusting is considered harmful.

37. What are combination and decomposition reactions? Write one example for each.

38. Explain displacement reaction with an example. Why does displacement occur?

39. What is a redox reaction? Why is it named so?

40. Describe any two methods to prevent rusting of iron. How does each method work?

41. Why do we apply heat in thermal decomposition reactions? Give one example.

42. State the law of conservation of mass. How does balancing a chemical equation reflect this law?

ANSWER KEY

MCQs (1–20):

1. a

2. c

3. c

4. b

5. b

6. a

7. a

8. b

9. c

10. a

11. d

12. d

13. d

14. b

15. a

16. c

17. a

18. a

19. c

20. a

Assertion–Reason (21–32):

21. Both true; R explains A

22. Both true; R explains A

23. Both true; R explains A

24. Both true; R explains A

25. A true, R false

26. Both true; R explains A

27. Both true; R explains A

28. Both true; R explains A

29. A true, R false

30. Both true; R explains A

31. A true, R false

32. A true, R false

Short Answers (33–42):

33. A chemical reaction is a process where substances convert into new substances. Indicators include colour change, gas evolution, temperature change, or precipitate formation.

34. A balanced equation has equal atoms on both sides. Balancing is needed because mass is conserved.

35. Oxidation = gain of oxygen (e.g., $Mg + O_2 \rightarrow MgO$). Reduction = loss of oxygen (e.g., $CuO + H_2 \rightarrow Cu$).

36. Corrosion is metal deterioration by chemical processes. Rusting weakens iron structures and damages machinery.

37. Combination: two substances form one product ($CaO + H_2O \rightarrow Ca(OH)_2$). Decomposition: one breaks into many ($CaCO_3 \rightarrow CaO + CO_2$).

38. A more reactive metal displaces a less reactive metal ($Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$). It occurs due to reactivity differences.

39. Redox involves both oxidation and reduction simultaneously. It is called a **"redox"** reaction because the word comes from combining **red**uction + **ox**idation

40. Painting and galvanisation prevent air/moisture contact and stop rusting.

41. Thermal decomposition needs heat to break compounds (e.g., $CaCO_3 \rightarrow CaO + CO_2$).

42. Mass is conserved in reactions. Balancing equations ensures atoms are equal on both sides.