CBSE Test Paper 05

Chapter 01 Chemical Reactions &

1. *The reactions in which more reactive element can displace less reactive element from a compound are called* **(1)**
   a. *Decomposition*
   b. *Displacement reaction*
   c. *combination reaction*
   d. *double displacement reaction*
2. *In an electrolytic cell where electrolysis is carried, anode has:* **(1)**
   a. *No*
   b. *chargeConnected to negative terminal of the battery*
   c. *Negative charge*
   d. *Positive charge*
3. *$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ is an example of* **(1)**
   a. *Combination reaction*
   b. *Redox reaction*
   c. *Decomposition reaction*
   d. *Double Displacement reaction.*
4. $\mathrm{ZnCO_3\,(s)}$ *undergoes 'X' to give ZnO + (CO_2). What does 'X' symbolized here?* **(1)**
   a. *Photo chemical decomposition*
   b. *Electrolysis*
   c. *displacement reactions*
   d. *thermal decomposition*
5. *Silver chloride turns grey in sunlight to from silver metal is a* **(1)**
   a. *photochemical combination*
   b. *photochemical decomposition*
   c. *None of these*
   d. *Double displacement*
6. *What is the role of a catalyst in a chemical reaction?* **(1)**

7. *Write three equations for decomposition reaction where energy is supplied in the form of heat, light and electricity?* **(1)**

8. *When magnesium ribbon is burnt in air what is the residue formed?* **(1)**

9. *A reddish brown vessel developed a green colored solid X when left open in air for a long time. When reacted with dil* H_2SO_4*, it formed a blue colored solution along with brisk effervescence due to colourless & odourless gas Z. X decomposes to form a black colored oxide Y of a reddish brown metal along with gas Z.Identify X, Y, & Z.* **(1)**

10. *Write a short note on Redox reactions.* **(3)**

11. *Aluminium is a reactive metal but is still used for packing food articles. Why?* **(3)**

12. *Complete the missing components/variables given as * and v in the following reactions:* **(3)**

i. $\mathbf{Pb(NO_3)_2(aq) + 2KI(aq) \rightarrow PbI_2\ (x) + 2KNO_3(y)}$

ii. $\mathbf{Cu(s) + 2AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + x(s)}$

iii. $\mathbf{Zn(s) + \underset{x}{\rightarrow} ZnSO_4(x) + \rightarrow H_2SO_4(aq) \quad H_2\ (y)}$

iv. $CaCO_3(s) \quad CaO(s) + CO_2(g)$

13. *Identify the type of reaction in the following* **(3)**

a. $ZnCO_3 + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2CO_3(aq)$

b. $2NaBr(aq) + Cl(g) \rightarrow 2NaCl(aq) + Br_2(aq)$

c. $2CuO(s) \xrightarrow{heat} 2Cu(s) + O_2(g)$

14. *What information do we get from a chemical equation ? Explain with the help of example.* **(5)**

15. *How is a chemical equation balanced ? Discuss with the help of an example.* **(5)**

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Answers

1. *b. Displacement reaction*

   Explanation: *One element which is higher in the reactivity series displaces the one which is lower from its compound is called displacement reaction*

2. *d. Positive charge*

   Explanation: *In Electrolytic Cell (s) electrical energy is transformed into chemical energy. Anode is positive electrode and Cathode is negative electrode. In Galvanic Cell anode is negative electrode and Cathode is positive electrode.*

3. *d. Double Displacement reaction.*

   Explanation: *A chemical reaction in which ions gets exchanged between two reactants which forms a new compound is called as double displacement reaction. It takes the form of XY + ZA → XZ + YA*

   $AgNO_3$ + NaCl → AgCl + $NaNO_3$ is an example of double displacement reaction.

4. *d. thermal decomposition*

   Explanation: *$ZnCO_3$ heating decomposes to give ZnO and O_2*

5. *b. photochemical decomposition*

   Explanation: *Under sunlight silver salt gets decomposed so it is a photochemical decomposition reaction*

6. *Catalyst accelerates/decelerates the rate of a chemical reaction without itself being consumed in the reaction.*

7. *(i)* $MgCO_3 \xrightarrow{heat} MgO + CO_2$

   (ii) $Cl \xrightarrow{light} 2Ag + Cl_2$

   (iii) $2NaCl \xrightarrow{electricity} 2Na + Cl_2$

8. *When magnesium ribbon is burnt in air the residue formed is a white colour powder*

called magnesium oxide. 2Mg + $O_2 \rightarrow 2MgO$

9. $X = \mathrm{CuCO_3.Cu(OH)_2}, \mathrm{Y = CuO}, \mathbf{Z} = \mathrm{CO_2}$

10. *The addition of oxygen to a substance or removal of hydrogen from a substance is known as* **oxidation** *whereas the addition of hydrogen to a substance or removal of oxygen from a substance is known as* **reduction**. *As oxidation and reduction reactions occur together, so they are known as* **Redox reactions**.

    eg. CuO + H_2 **à** *Cu +H_2O*

    H_2 is oxidised to form H_2O and CuO is reduced to form Cu.

11. *Aluminum is quite reactive, but the upper surface gets converted into its oxide called aluminum oxide (AI_2O_3) once it is kept in the air, and a thin coating is developed on the surface. This aluminium oxide is not reactive. Therefore, this metal is used for packing food articles which do not get spoiled in the foil.*

12. i. $x-(s); y-(aq)$
    ii. $x-2Ag$
    iii. $x-(aq); y-(g)$
    iv. $x-Heat$

13. a. *Double decomposition reaction [An exchange of ions took place]*
    b. *Displacement reaction [A more reactive non-metal displaces a less reactive non- metal from its salt solution.]*
    c. *Decomposition reaction / Reduction reaction [A compound decomposes to form two or more products. / CuO is reduced to Cu.]*

14.
- *A chemical equation will tell you the formulas and symbols of the reactants and products.*
- *A chemical equation can show the physical state of a substance, whether it is a solid, liquid, gas, or in solution.*
- *A chemical equation can show if special conditions are required for a reaction to take place, such as adding heat or using a catalyst.*
- *And, if the equation is balanced: The coefficient numbers in the equation show the number of molecules, formula units, or atoms of the species involved in the*

reaction. The coefficients also equal the number of moles of each reactant and product.

In order to explain the information conveyed by a chemical equation, let us consider the reaction :

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

The above equation conveys the following information :

1. *Zinc reacts with hydrogen chloride to give zinc chloride and hydrogen.*
2. *One atom of zinc combines with two molecules of hydrogen chloride to form one molecule of hydrogen chloride and one molecule of hydrogen.*
3. *One mole of zinc combines with two moles of hydrogen chloride to form one mole of zinc chloride and one mole of hydrogen.*
4. *One mole of zinc combines with two moles of hydrogen chloride to give one mole of zinc chloride and 22.4 litres of H_2 at S.T.P.*
5. *65 parts by weight of zinc combines with 36.5 parts by weight of hydrogen chloride to form 36 parts by weight of zinc chloride and 2 parts by weight of hydrogen.*

15. *Balancing of chemical equation is the process of making the number of different types of atoms equal on both the reactant and product sides. The balancing of a chemical equation is completed in the following steps:*
    - i. *Write the symbol and formula of the various reactants and products without making them equal. This is called a skeleton equation.*
    - ii. *Select the biggest formula which contains the largest number of atoms. Balance its atoms on the sides of the arrow.*
    - iii. *Balance the remaining atoms on the both sides of the arrow.*
    - iv. *Make the equation molecular. The gases like hydrogen, oxygen, nitrogen, chlorine etc. are first written in the atomic form. But then they are written in molecular form.*

    Example. Let us consider a reaction in which sodium metal reacts with water to form sodium hydroxide and hydrogen :

    Sodium + Water $\rightarrow$ Sodium hydroxide + Hydrogen

    The steps for balancing the above equation are as follows :

    - i. *The skeleton equation for the chemical reaction is : $Na + H_2O \rightarrow NaOH + H$*

ii. *The number of Na atoms on both sides of the arrow are equal. Similarly, the number of oxygen and hydrogen atoms on both sides of the equation are also equal.*

iii. *This means that the equation is balanced but it is not molecular because hydrogen is in atomic form.*

iv. *To make hydrogen molecular or to write it as* H_2 *multiply the entire equation by 2.*

The equation may be re-written as :

$2Na + 2H_2O \rightarrow 2NaOH + H_2$ *This is balanced equation.*