

GRADE 10TH SCIENCE
CHAPTER 1

Chemical Reactions and Equations

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Read the following and answer any four questions from 2(i) to 2(v).

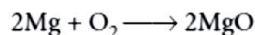
In decomposition reactions, a single reactant breaks down to form two or more products. Decomposition reaction is opposite to combination reaction. Thermal decomposition reactions use the energy in form of heat for decomposition of reactants. Electrolytic decomposition reactions involve the use of electrical energy for the decomposition of reactant molecules. Photolysis or photochemical decomposition involves the use of light energy for the purpose of decomposition.

- (i) Which of the following reactions is a decomposition reaction?
- (a) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ (b) $\text{NH}_4\text{CNO} \longrightarrow \text{H}_2\text{NCONH}_2$
 (c) $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$ (d) $\text{H}_2 + \text{I}_2 \longrightarrow 2\text{HI}$
- (ii) $2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + n\text{A} + \text{O}_2$
 What is $n\text{A}$ in the given reaction?
- (a) 4NO (b) 4NO_2 (c) 2PbNO_2 (d) NO_2
- (iii) Amino acid is formed by the decomposition of which component of our diet?
- (a) Carbohydrate (b) Starch (c) Protein (d) Fat
- (iv) Silver chloride on exposure to sunlight for a long duration turns grey due to
- (I) the formation of silver by decomposition of silver chloride
 (II) sublimation of silver chloride
 (III) decomposition of chlorine gas from silver chloride
 (IV) oxidation of silver chloride
- The correct statement(s) is/are
- (a) Only (I) (b) Only (II) and (III) (c) Only (I) and (II) (d) Only (IV)
- (v) What type of chemical reaction takes place when electricity is passed through water?
- (a) Thermal decomposition (b) Electrolytic decomposition
 (c) Photochemical decomposition (d) Displacement reaction

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Read the following and answer any four questions from 4(i) to 4(v).

In a balanced chemical reaction, equal number of atoms are present on both sides of reaction. A balanced chemical reaction is based on law of conservation of mass which means that total mass of reactants and products participating in a reaction must be equal. For example, a balanced chemical equation of burning of magnesium in oxygen to form magnesium oxide is written as :



The mass of reactants ($2 \times 24 + 32 = 80$) is equal to the mass of products [$2 \times (24 + 16) = 80$].

- (i) In a reaction, 35 g of reactant, PQ breaks down into 20 g of product, P and an unknown amount of product, Q. Using the law of conservation of mass, weight of products, Q will be
 (a) 25 g (b) 35 g (c) 30 g (d) 15 g
- (ii) When solid mercury (II) oxide is heated, liquid mercury and oxygen gas are produced. Which of the following statements is true regarding the balanced chemical equation for this process?
 (a) 1 mole of mercury (II) oxide produces two moles of mercury and one mole of oxygen gas.
 (b) 2 moles of mercury (II) oxide produce one mole of mercury and one mole of oxygen gas.
 (c) 1 mole of mercury (II) oxide produces half mole of mercury and half mole of oxygen gas.
 (d) 2 moles of mercury (II) oxide produce 2 moles of mercury and one mole of oxygen gas.
- (iii) Which of the following laws is satisfied by a balanced chemical equation?
 (a) Law of multiple proportions (b) Law of conservation of mass
 (c) Law of conservation of motion (d) Law of conservation of magnetism
- (iv) In the given chemical reaction,

$$2\text{C}_6\text{H}_6(l) + 15\text{O}_2(g) \longrightarrow m\text{CO}_2(g) + n\text{H}_2\text{O}(l)$$
 The values of m and n are respectively
 (a) 14 and 8 (b) 12 and 6 (c) 8 and 10 (d) 12 and 10
- (v) Sulphur dioxide reacts with oxygen to form sulphur trioxide. What would be the molar ratio of sulphur dioxide to sulphur trioxide?
 (a) 2 : 3 (b) 1 : 1 (c) 1 : 2 (d) 3 : 2

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Read the following and answer any four questions from 5(i) to 5(v).

In a chemical reaction, reactants are converted into products. The conversion of reactants into products in a chemical reaction is often accompanied by some features which can be observed easily. These easily observed features which take place as a result of chemical reaction are known as characteristics of chemical reactions. Some important characteristics of chemical reactions are :

- (I) Evolution of heat
(II) Formation of precipitate
(III) Change in colour
(IV) Change in temperature
(V) Change in state

Any one of these general characteristics can tell us whether a chemical reaction has taken place or not.

- (i) Reaction of magnesium with air is a/an
(a) exothermic reaction
(b) endothermic reaction
(c) reversible reaction
(d) substitution reaction.
- (ii) In the following reaction,
$$\text{Ca}_{(aq)}^{2+} + 2\text{OH}_{(aq)}^{-} \longrightarrow \text{Ca}(\text{OH})_{2(s)}$$
precipitate of calcium hydroxide will be of
(a) green colour
(b) blue colour
(c) brown colour
(d) white colour.
- (iii) In the given reaction,
$$\text{S}_{(s)} + \text{O}_{2(g)} \longrightarrow \text{SO}_{2}$$
the physical state of SO_2 is
(a) liquid
(b) solid
(c) gaseous
(d) all three.
- (iv) Which one of the following processes involve chemical reactions?
(a) Storing of oxygen gas under pressure in a gas cylinder.
(b) Keeping petrol in a china dish in the open.
(c) Liquefaction of air.
(d) Heating copper wire in the presence of air at high temperature.
- (v) In which of the following reactions, high amount of heat energy will be evolved?
(a) Electrolysis of water
(b) Dissolution of NH_4Cl in water
(c) Burning of L.P.G.
(d) Decomposition of AgBr in the presence of light