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Questions:

Case Study Questions

1. 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 :

$2Mg + O_2 \longrightarrow 2MgO$

The mass of reactants (2 x 24 + 32 = 80) is equal to the mass of products [2 x (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) 25g	(b) 35g	(c) 30g	(d) 15g

(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

$C_6H_{6(l)} + 15O_{2(g)} \longrightarrow mCO_{2(g)} + nH_2O_{(l)}$

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

2. Chemical reaction, a process in which one or more substances, the reactants, are converted to one or more different substances, the products. Substances are either chemical elements or compounds. A chemical reaction rearranges the constituent atoms of the reactants to create different substances as products. Study this table related to the different types of reactions / processes and answer the questions that follow.

S.No.	Name of Process	Word Equation
i	Combustion	Magnesium + Oxygen $\xrightarrow{heat}$ Magnesium dioxide
ii	Photosynsthesis	Carbon dioxide + Water $\xrightarrow[chlorophyll]{sunlight}$ Glucose + Oxygen + Water
iii	Combination	Iron + Sulphur $\xrightarrow{heat}$ Iron sulphide
iv.	Photodecomposition	Silver bromide $\xrightarrow{light}$ Silver + Bromine

(i) The reaction in which two or more substances combine to form a single substance under suitable conditions is

(a) combination reaction (b) combustion

(c) decomposition reaction (d) photosynthesis

(ii) Which of the following is essential for photosynthesis?

(a) Sunlight (b) Chlorophyll (c) Glucose (d) Both 'a' and 'b'

Photosynthesis is the process by which green plants and some other organisms use sunlight to synthesis nutrients from carbon dioxide and water.

(iii) When a chemical compound decomposes on absorbing light and energy, then the reaction which takes place is known as

(a) photosynthesis (b) photodecomposition

(c) combination (d) thermal decomposition.

A photodecomposition is a chemical reaction in which an inorganic chemical (or an organic chemical) is broken down by photons and is the interaction of one or more photons with one target molecule.

(iv) Which of the following reactions is an example of combustion reaction ?

$(a)C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} (b)Zn_{(s)} + H_2SO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + H_{2(g)} (c)Zn_{(s)} + 2HCl_{(aq)} \longrightarrow ZnCl_{2(aq)} + H_{2(g)} (d)3Mg_{(s)} + N_{2(g)} \longrightarrow Mg_3N_{2(s)}$

A combustion reaction is a reaction in which a substance reacts with oxygen gas, releasing energy in the form of light and heat.

(v) Which of the following is an example of combination reaction?

$(a)H_{2(g)} + Cl_{2(g)} \xrightarrow{light} 2HCl_{(g)} (b)Fe_{(s)} + S_{(s)} \longrightarrow FeS_{(g)} (c)2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O_{(l)} (d)All\ of\ them$

A combination reaction (also known as a synthesis reaction) is a reaction where two or more elements or compounds (reactants) combine to form a single compound (product).

5 Marks

3. (i) What is rancidity?

(ii) Suggest two methods to reduce the problem of rancidity.

(iii) How is corrosion different from rusting?

4. (i) A student mixes sodium sulphate powder in barium chloride. What change would the student observe on mixing the two powder. Justify your answer and explain how he can obtained the desired change?

(ii) (a) Arrange the following metals in the increasing order reactivities.

Copper, zinc, aluminiumn and iron.

(b) List two observations you would record in your 30 minutes after adding iron filings to copper sulphate solution.

3 Marks

5. (a) Write chemical equations.

(i) When carbon dioxide gas is passed through lime water.

(ii)When excess of carbon dioxide gas is passed through lime water.

(b) List two natural forms of calcium carbonate.

6.Balance the following chemical equations.

$(i)\ BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + HCl$

$(ii)\ \mathrm{Ca(OH)_2 + HNO_3 \longrightarrow Ca(NO_3)_2 + H_2O}$

$(iii)\ \mathrm{Pb(NO_3)_2 \longrightarrow PbO + NO_2 + O_2}$

$(iv)\ \mathrm{MnO_2 + HCl \longrightarrow MnCl_2 + H_2O + Cl_2}$

2 Marks

7.A metal X available in the form of ribbon burns in air with a dazzling white light once heated to its ignition temperature. It leaves a white powder Y which dissolves in water. The solution so formed turns red litmus blue. Identify X and Y and write a balanced chemical equation of the reaction.

(a) Identify 'X' and 'Y'.

(b) Write a balanced chemical equation for this reaction.

Multiple Choice Question

8.What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct answer

(a) Hydrogen gas and Iron chloride are produced. **(b) Chloride gas and Iron hydroxide are produced.** **(c) No reaction takes place** **(d) Iron salt and water are produced**

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