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Class 10 chemistry ch 1 notes pdf

Topics in the chapter • Introduction • Chemical reaction • Chemical equation • Sustainable chemical equation • Types of chemical reaction • Corrosion • Rancidity Introduction → Most substances around us change differently. Some of these changes are temporary, without the formation of a new substance. These are called physical changes. → In some other changes, a new substance has been created in which the reagent or parent loses its identity by creating a new substance called a product. These changes are permanent changes as you won't get the reagent back. Chemical reaction → Chemical reaction is a process in which two or more substances react with each other to form a new substance with different properties. → These are the following changes to determine that a chemical reaction has occurred: (i) Change in state (ii) Color change (iii) Gas evolution (iv) Temperature change Chemical equation → The chemical equation is a symbolic representation of a chemical reaction in the form of symbols and formulae in which reagent units are given on the left and in product units on the right. Magnesium + oxygen → oxygen (Reagent) (Product) A balanced chemical equation → Chemical equation that shows a chemical reaction must be balanced. A balanced chemical equation occurs when the number of atoms participating in the reactants page is equal to the number of atoms on the product side. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$ 3Fe (s) + 4H₂O (g) → Fe₃O₄ (s) + 4H₂ (g) Types of chemical reaction → Combination reaction: A reaction in which a single product is formed from two or more reactants is known as a combination reaction. $CaO (s) + H_2O (l) \rightarrow Ca(OH)_2 (aq)$ Calcium oxide reacts vigorously with water to produce gaseous lime (calcium hydroxide) releasing a large amount of heat. The lactic lime solution produced by the reaction is applied to the white walls of washing. Calcium hydroxide reacts slowly with carbon dioxide in the air, forming a thin layer of calcium carbonate on the walls. Calcium carbonate is formed after two to three days of white washing and gives a glossy finish to the walls. It is worth noting that the chemical formula for marble is also CaCO₃. $Ca(OH)_2 (aq) + CO_2 (g) \rightarrow CaCO_3 (s) + H_2O (l)$ (extinguished lime) (calcium carbonate) Coal combustion: $C (s) + O_2 (g) \rightarrow CO_2 (aq)$ Water formation: $H_2 (H_2 (s) Carbonate combustion: C (s) + O (g) \rightarrow CO_2 (aq)$ Water formation: $H_2 (H_2 (s) g) + O_2 (g) \rightarrow H_2O (aq)$ Natural gas combustion (methane): $CH_4 (g) + O_2 (g) \rightarrow CO_2 (g) + H_2O (l)$ → exothermic reaction : The process of exothermia releases heat, and causes an increase in temperature in the immediate surroundings rice , potatoes and bread that we eat, contain carbohydrates. These carbohydrates are broken down to form glucose. This glucose combines with oxygen in our body's cells and provides energy. A special name for this reaction is breathing is an exothermic reaction. $C_6H_{12}O_6 (aq) + 6O_2 (aq) \rightarrow 6CO_2 + 6H_2O (l) + \text{energy (glucose)}$ → Endothermic reaction: Endothermia process absorbs heat and cools The decomposition of plant matter into compost is also an example of an endothermic reaction. → reaction: When a single reactant decomposes to give simpler products. This is a decomposition reaction. White silver chloride turns gray in the sun. This is due to the decomposition of silver chloride into silver and chlorine by light. The above reactions are used in black and white photography. → Displacement reaction: A displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its compound. Both metals and non-metallic metals are involved in displacement reactions. Reaction of ferrous nails with copper sulphate solution. $Fe (s) + CuSO_4 (aq) \rightarrow FeSO_4 (g) + Cu (s)$ Pb (s) + CuCl₂ (aq) → PbCl₂ (aq) + Cu (s) → double displacement reaction: double displacement reaction, also known as a double exchange or metathesis reaction, is a type of chemical reaction in which two compounds react, and positive ions (cation) and negative ions (anions) of two reactants change places to form two new compounds or products. $Na_2(SO_4) (aq) + BaCl_2 (aq) \rightarrow BaSO_4 (s) + NaCl (aq)$ → Redox reaction: Oxidation reduction reaction (Redox) is a type of chemical reaction that involves the transfer of electrons between two species. An oxidation reduction reaction is any chemical reaction in which the oxidation rate of a molecule, atom or ion changes by obtaining or losing an electron. Oxidation: This process involves oxygen gain or hydrogen loss. Reduction: This process involves hydrogen growth or oxygen loss. It is a substance that gives oxygen or gains hydrogen. Or it's a substance that is reduced and oxidizes others. → Reducing Agent is a substance that gives hydrogen or oxygen gains. Or it's a substance that is oxidized and reduces others. Oxidation is a process that involves electron loss, but reduction is a process that involves electron growth. The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases, etc. Rusting – Iron, when it reacts with oxygen and moisture, forms a red substance called rust. Rancid → The taste and smell of foods containing fat and oil changes when they are left to air for a long time. It's called endocy. This is due to the oxidation of fat and oil present in the food material. → This can be prevented by various methods, such as the addition of antioxidants to food materials, storing food in an airtight container and flushing air with nitrogen. NCERT Solutions chapter 1 Chemical reactions and equations Additional questions from Chapter 1 Chapter 1 Chemical Reactions and Equations MCQ Test Chapter 1 Chemical Reactions and Equations Video Chapter 1 Chemical Reactions and Equations Back to Notes for Class 10th Science Science is a theme that explains how the world around us is made. Chemical are used to explain the different processes that take place around us. From rust to decomposition, chemical reactions provide more in-depth insight into how molecular interaction and changes occur. In other words, Chapter 1 of CBSE Class 10 Science explains how the substance changes. Learn more about chemical reactions and equations by exploring CBSE notes for Chapter 1 science class 1. These CBSE notes are exhaustive and detailed, but concise enough to take a look at exam preparation. CBSE Class 10 Science Revision Notes Chapter 1 Chemical Reactions and Equations: - Download PDF Here One or more new substances with new physical and chemical properties are created. Here, when copper sulphate reacts with iron, two new substances are formed, i.e. Physical change – there is a change in color or condition, but no new substance is formed. Example: Water changes to steam at boiling point, but no new substance is formed(Although steam and water look different when they are made to react with a piece of Na, they react in the same way and give exactly the same products). This is associated only with a change in condition (liquid to fumes). To learn more about physical and chemical changes, visit here. Observations that help determine the chemical reaction Chemical reaction can be determined by any of the following observations: a) Gas evolution b) Change in temperature c) Formation of sediment d) Change in colour e) Change in status Chemical reactions are chemical changes in which reactants transform into products by forming or breaking bonds (or both) between different atoms. Types of chemical reactions Given different factors, chemical reactions are grouped into multiple categories. A few examples are: • Connection • Distribution • Single displacement • Double displacement • Redox • Endothermic • Exothermic • Precipitation • Neutralization To learn more about chemical reactions, visit here. A word equation is a chemical reaction expressed in words, not in chemical formulas. It helps to identify reactants and products in a chemical reaction. For example, Sodium + chlorine → sodium chloride The above equation means sodium reacts with chlorine to form sodium chloride. Element symbols and their symbol values are the chemical code of the element. Each element has a single or two-letter atomic symbol, which is an abbreviated form of its name. Valency is the ability to combine an element. It can be considered the number of electrons lost, profited or shared by an atom when it connects to another atom to form a molecule. Writing chemical equations Representation of chemical reaction in terms of symbols and chemical patterns of reactants and products is known as the chemical equation. • For solids, the symbol is (s). • For liquids, this is (l). • For gases, this is (g). • For acesighted solutions, this is (aq). • In the case of gas produced by reaction by (↑). • In the case of sediment formed in reaction, it is represented by (↓). To learn more about the chemical equation, visit here. Balancing chemical reaction Mass protection According to mass protection law, no atoms can be created or destroyed by chemical reaction, so the number of atoms for each element on the reactive side must balance the number of atoms present on the product side. In other words, the total weight of the products produced by the chemical reaction is equal to the total weight of the reactants who participated in the chemical reaction. Balanced chemical equation The chemical equation, in which the number of atoms of each element on the reactive side is equal to that for products, is called balanced equations. To learn more about Sustainable Chemical Equations, visit here. Steps for balancing chemical equations Method of hits and trials: When balancing the equation of the equation, change the coefficients (numbers before the compound or molecule) so that the number of atoms of each element is the same on each side of the chemical equation. Hash technique for balancing the chemical equation Example: $aCaCO_3 + bH_3PO_4 \rightarrow cCa_3(PO_4)_2 + dH_2CO_3$ Configure a series of simultaneous equations, one for each element. Ca: a=3c C: a=d O: 3a+4b=8c+3d H: 3b=2d P: b=2c Let's set c=1 Then a=3 and d = a = 3 b = 2c = 2 Yes a=3; b=2; c=1; d=3 The balanced equation is $3CaCO_3 + 2H_3PO_4 \rightarrow Ca_3(PO_4)_2 + 3H_2CO_3$ To learn more about balancing the chemical equation, visit here. Chemical reactions and equations II Types of chemical reactions Taking into account various factors, chemical reactions are grouped into many categories. A few examples include: • Combination • Distribution • Single displacement • Double displacement • Redox • Endothermic • Exothermic • Precipitation • Neutralization To learn more about the types of chemical reaction, visit here. In an associated reaction, two elements or one element and one compound or two compounds combine to give one product. Single reactant decomposition reaction decomposes into the use of heat or light or electricity to give two or more products. Types of decomposition reactions: a. Decomposition reactions that require heat – thermal decomposition or thermolysis. Thermal decomposition HgO b. Decomposition reactions that require light – photolytic distribution or photolysis. Photolytic distribution H_2O_2 c. Decomposition reactions that require electricity – electrolytic decomposition or electrolysis. Electrolytic decomposition H_2O More information about decomposition reactions, Watch the following video: Displacement reaction More reactive element displaces a less reactive element from its compound or solution. Double displacement reaction Ion exchange between reactants takes place to administer new products. For example, the precipitate reaction An insoluble compound called sediment is formed when two solutions containing soluble salts are combined. To get more more Precipitation reaction, visit here. Redox oxidation and reduction reaction is carried out simultaneously. Oxidation: The substance loses electrons or gains oxygen or loses hydrogen. Reduction: The substance gains electrons or loses oxygen or gains hydrogen. Oxidizing agent – a substance that oxidizes another substance and is reduced. Reducing agent – a substance that reduces another substance and self-oxidizes to oxidize. To learn more about Redox Reaction, visit here. Endothermic and exothermic reaction Exothermic reaction – heat evolves during the reaction. Most of the associated reactions are exothermic. $Al + Fe_2O_3 \rightarrow Al_2O_3 + Fe + \text{heat}$ $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + \text{heat}$ To learn more about the exothermic reaction, visit here. Endothermic – Heat is required to carry out the reaction. $6CO_2 + 6H_2O + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6O_2$ Glucose Most decomposition reactions are endothermic. To learn more about Endothermic Reaction, visit here. Corrosion Gradual deterioration of the material, usually metal, by the action of moisture, air or chemicals in the surrounding environment. Rusting: $4Fe(s) + 3O_2(\text{from air}) + xH_2O(\text{moisture}) \rightarrow 2Fe_2O_3 \cdot xH_2O(\text{rust})$ Copper corrosion: $Cu(s) + H_2O(\text{moisture}) + CO_2(\text{from air}) \rightarrow CuCO_3 \cdot Cu(OH)_2(\text{green})$ Silver corrosion: $Ag(s) + H_2S(\text{air}) \rightarrow Ag_2S(\text{black}) + H_2(g)$ To learn more about Corrosion, visit here. Yingle refers to the oxidation of fats and oils in food that is stored for a long time. It gives an unpleasant smell and unpleasant taste to eat. Endoper food causes infection of the stomach when ingested. Prevention: (i) Use of sealed containers (ii) Nitrogen packaging (iii) Cooling (iv) Addition of antioxidants or preservatives