**Question Types :**

* MCQ
* multiple\_mcq
* multiple\_mcq\_any
* assertion
* VSA
* SA
* LA
* HOTS
* descriptive
* number
* tf
* fill-blank

Complexity levels: easy, medium, difficult

**Chapter 1- Chemical Reactions & Equations**

**Topic 1: Introduction to chemical reactions**

| Medium | |
| --- | --- |
| MCQ | |
| One of the following does not happen during a chemical reaction. That is | |
| 1 | Breaking of old chemical bonds and formation of new chemical bonds |
| 2 | Formation of new substances with entirely different properties |
| 3 | Atoms of one element change into those of another element to form new products. |
| 4 | A rearrangement of atoms takes place to form new products. |
| 3 | |
| Atoms do not change to form another element in a chemical reaction. They only react and form new compounds. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following does not involve a chemical reaction? | |
| 1 | Digestion of food in our body |
| 2 | Process of respiration |
| 3 | Burning of candle wax when heated |
| 4 | Melting of candle wax on heating |
| 4 | |
| The chemical reaction is the process in which the chemical change occurs and the reactant will convert into a chemically different product. So,  (1) Chemical digestion is also a chemical process.  (2) Respiration is the chemical process.  (3) Burning of the wax of a candle is a chemical process.  (4) The melting of wax is the physical process in which solid wax converts into liquid wax while there are no other changes in the chemical environment. | |

| Easy | |
| --- | --- |
| MCQ | |
| You are given the solution of lead nitrate. In order to obtain a yellow precipitate, you should mix with it a solution of | |
| 1 | Potassium chloride |
| 2 | Potassium nitride |
| 3 | Potassium sulphide |
| 4 | Potassium iodide |
| 4 | |
| Yellow precipitate is due to the formation of P b I 2 which forms when lead nitrate is mixed with potassium iodide.  Pb(NO3)2 (aq) + 2KCl(aq) → PbCl2 (s)↓ + 2KNO3 (aq) | |

| Easy | |
| --- | --- |
| MCQ | |
| Which of the following is not a physical change? | |
| 1 | Boiling Of Water To Give Water Vapour |
| 2 | Melting Of Ice To Give Water |
| 3 | Dissolution Of Salt In Water |
| 4 | Combustion Of Liquefied Petroleum Gas (Lpg) |
| 4 | |
| Combustion of Liquified Petroleum Gas is a chemical change. | |

| Easy | |
| --- | --- |
| MCQ | |
| Which one of the following statements is incorrect? | |
| 1 | All element are homogeneous |
| 2 | Compounds always contain two or more different elements. |
| 3 | A mixture is not always heterogeneous |
| 4 | Air is a heterogeneous mixture |
| 4 | |
| Air is a homogeneous mixture because it is a type of mixture in which gaseous substances like nitrogen and oxygen are present. | |

| Medium | |
| --- | --- |
| VSA | |
| What are the characteristics of chemical reactions? | |
| Characteristics of chemical reactions include changes in temperature, colour, state, the evolution of a gas and the formation of a precipitate. | |

| Easy | |
| --- | --- |
| VSA | |
| List some chemical reactions observed in daily life. | |
| Souring of milk; formation of curd from milk; ripening of fruits. | |

| Medium | |
| --- | --- |
| SA | |
| Why should magnesium ribbon be cleaned before burning in the air? | |
| Quicklime reacts with water to form slaked lime and produces a lot of heat and hissing sound. | |

| Difficult | |
| --- | --- |
| LA | |
| (a) State two characteristics of the chemical reaction which takes place when diluting sulphuric acid is poured over zinc granules.  (b) Give two characteristics of the chemical reaction which occurs on adding potassium iodide solution to lead nitrate solution. | |
| (a) When dilute sulphuric acid is poured over zinc granules, hydrogen gas is evolved and the mixture becomes hot. Hence, "evolution of a gas" and "change in temperature" are two characteristics of this chemical reaction.  **→ +** + Heat  (b) On adding potassium iodide solution to lead nitrate solution, yellow precipitates of lead iodide are formed and the colour of the solution changes from colourless to yellow. Hence, "formation of a precipitate" and "change in colour" are the characteristics of this chemical reaction.  **+ → +** | |

| Medium | |
| --- | --- |
| LA | |
| State any two observations in an activity that may suggest that a chemical reaction has taken place. Give examples to support your answer. | |
| A chemical change can be confirmed by any of the following observations:   1. Change in temperature 2. Evolution of gas   For example: Calcium oxide reacts vigorously with water to produce calcium hydroxide. During this process, a large amount of heat is also evolved, which increases the temperature of the system. This confirms that a chemical reaction has taken place.    Also, when calcium carbonate is heated, it decomposes to form calcium oxide and carbon dioxide. In this reaction, calcium carbonate breaks down to form calcium oxide and carbon dioxide. Here, the evolution of the gas (carbon dioxide) confirms that a chemical reaction has taken place. | |

| Difficult | |
| --- | --- |
| HOTS | |
| A silvery-white metal X taken in the form of a ribbon when ignited, burns in the air with a dazzling white flame to form a white powder Y. When water is added to powder Y, it dissolves partially to form another substance Z.  (a) What could metal X be?  (b) What is powder Y?  (c) With which substance does metal X combine to form powder Y?  (d) What is substance Z? Name one domestic use of substance Z.  (e) Write a balanced chemical equation of the reaction which takes place when metal X burns in air to form powder Y. | |
| a) Metal X is Magnesium (Mg).  b) Powder Y is Magnesium oxide, (MgO).  c) The substance with which metal X (Magnesium) combines to form powder Y (Magnesium oxide) is Oxygen (O2).  d) Substance Z is Magnesium hydroxide Mg(OH)2. It is used as an antacid to relieve indigestion.  e) The balanced chemical equation is given below: | |

**Topic 2: Chemical equations**

| Easy | |
| --- | --- |
| MCQ | |
| The chemical equations are balanced to satisfy one of the following laws in chemical reactions. This law is known as | |
| 1 | Law of Conservation of Momentum |
| 2 | Law of Conservation of Mass |
| 3 | Law of Conservation of Motion |
| 4 | Law of Conservation of Magnetism |
| 2 | |
| Law of Conservation of Mass. When we balance an equation, we determine the ratio of reactants to products which allows for the total number of atoms of reactants to match the number of atoms of the products. Since the type of atoms does not change and the number of atoms stays the same, the total mass that goes into the chemical change will match the mass that comes out after the change. | |

| Easy | |
| --- | --- |
| MCQ | |
| Which information is not conveyed by a balanced chemical equation? | |
| 1 | Physical states of reactants and products. |
| 2 | Symbols and formulae of all the substances involved in a particular reaction. |
| 3 | Number of atoms/molecules of the reactants and products formed. |
| 4 | Whether a particular reaction is actually feasible or not. |
| 4 | |
| Whether a particular reaction is actually feasible or not A balanced chemical equation states the physical state of reactants and products. Symbols of elements and formula of compounds and numbers of atoms/molecules formed in the reaction but do not tell about the feasibility of the reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following correctly balances this equation? | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 2 | |
| The number of atoms of H and Cl are balanced on both sides.  Reactants: Hydrogen atoms(H) =2, Chlorine atoms(Cl) =2  Products: Hydrogen atoms(H) =2, Chlorine atoms(Cl) =2 | |

| Easy | |
| --- | --- |
| MCQ | |
| Consider the reaction: S(s) + O2(g)→ SO₂. The state of SO₂ in this reaction is | |
| 1 | Liquid |
| 2 | Solid |
| 3 | Gaseous |
| 4 | Semi Solid |
| 3 | |
| The physical state of SO2 in room temperature is gaseous. | |

| Medium | |
| --- | --- |
| MCQ | |
| For the following reaction:: Zinc carbonate (s) ⟶ Zinc oxide (s) + Carbon dioxide (g)  symbol equation must contain | |
| 1 | ZnO, CO2, ZnC |
| 2 | ZnCO3, ZnO, CO |
| 3 | ZnO, CO2, ZnCO4 |
| 4 | ZnO, CO2, ZnCO3 |
| 4 | |
| The chemical symbol for zinc carbonate is ZnCO3, zinc oxide is ZnO and for carbon dioxide is CO2. | |

| Easy | |
| --- | --- |
| MCQ | |
| The representation of a chemical reaction by using the symbols and formula of reactants and products is called | |
| 1 | Chemical reaction |
| 2 | Chemical equation |
| 3 | Balanced chemical reaction |
| 4 | All of these |
| 2 | |
| A chemical equation is a symbolic representation of a chemical reaction, in the form of symbols and formulae | |

| Medium | |
| --- | --- |
| MCQ | |
| When the following reaction equation is properly balanced, the number of moles of O2 will be | |
| 1 | 1.5 moles |
| 2 | 3.5 moles |
| 3 | 3 moles |
| 4 | 5 moles |
| 4 | |
| The balanced chemical equation of the above reaction is | |

| Medium | |
| --- | --- |
| MCQ | |
| When the following reaction is properly balanced the number of moles of O2 will be | |
| 1 | 1.5 moles |
| 2 | 13 moles |
| 3 | 19 moles |
| 4 | 38 moles |
| 3 | |
| The balanced chemical equation of the above reaction is | |

| Difficult | |
| --- | --- |
| MCQ | |
| Which of the following correctly represents the balanced chemical reaction between Aluminium and sulphur ? | |
| 1 | 16Al + 3S8 → 8 Al2S3 |
| 2 | 12Al + S8 → 4Al3S2 |
| 3 | 8Al + S8 → 8AlS |
| 4 | 4Al + S8 → 4AlS2 |
| 1 | |
| The balanced chemical equation of the above reaction is  16Al + 3S8 → 8 Al2S3 | |

| Easy | |
| --- | --- |
| MCQ | |
| A balanced chemical equation is in accordance with | |
| 1 | Avogadro’s law |
| 2 | Law of multiple proportions |
| 3 | Law of conservation of mass |
| 4 | Law of gaseous volumes |
| 3 | |
| A balanced chemical equation is in accordance with the law of conservation of mass | |

| Medium | |
| --- | --- |
| MCQ | |
| No. of moles of NH4Cl formed when, 3 moles Barium chloride is allowed to react with 2 moles ammonium phosphate will be | |
| 1 | 1 |
| 2 | 3 |
| 3 | 4 |
| 4 | 6 |
| 4 | |
| → | |

| Easy | |
| --- | --- |
| VSA | |
| Balancing of chemical equations is based on which law? | |
| Balancing a chemical equation is based on the law of conservation of mass. | |

| Medium | |
| --- | --- |
| VSA | |
| How will you represent a chemical equation? | |
| A chemical equation is represented as A+B → C+D  In this equation, A and B are called reactants, and C and D are called products. The arrow shows the direction of a chemical reaction. | |

| Easy | |
| --- | --- |
| VSA | |
| What is the method opted for balancing a chemical equation? | |
| The hit and trial method | |

| Medium | |
| --- | --- |
| VSA | |
| Why should chemical equations be balanced? | |
| Because of the law of conservation of mass: the total number of atoms of each element should be equal on both sides of a chemical equation. | |

| Easy | |
| --- | --- |
| VSA | |
| What does the symbol (aq) represent in a chemical equation? | |
| (aq) stands for aqueous, which indicates that the substance is dissolved in water | |

| Easy | |
| --- | --- |
| SA | |
| Define a balanced chemical equation. | |
| A balanced chemical equation has an equal number of atoms of different elements in the reactants and products i.e. a balanced chemical equation has equal masses of various elements in reactants and products. A balanced chemical equation obeys the Law of Conservation of Mass. | |

| Medium | |
| --- | --- |
| SA | |
| Define an unbalanced chemical equation. | |
| An unbalanced chemical equation has an unequal number of atoms of one or more elements in the reactants and products i.e. an unbalanced equation has unequal masses of various elements in reactants and products. An unbalanced chemical equation obeys the Law of Conservation of Mass. | |

| Difficult | |
| --- | --- |
| SA | |
| Write the balanced equation for the following chemical reactions. **(NCERT)**  (i) Hydrogen + Chlorine → Hydrogen chloride  (ii) Barium chloride + Aluminium sulphate → Barium sulphate + Aluminium chloride  (iii) Sodium + Water → Sodium hydroxide + Hydrogen | |
| i)ii) + → +iii) 2Na + 2→ 2NaOH + | |

| Medium | |
| --- | --- |
| SA | |
| Write a balanced chemical equation with state symbols for the following reactions. **(NCERT)**  (i) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.  (ii) Sodium hydroxide solution (in water) reacts with a hydrochloric acid solution (in water) to produce sodium chloride solution and water. | |
| i) (aq) + (aq) → (s) + 2NaCl(aq)ii) NaOH(aq) + HCl(aq) → NaCl(aq) + H2O(l) | |

| Easy | |
| --- | --- |
| SA | |
| What is a balanced chemical equation? Why should chemical equations be balanced? **(NCERT)** | |
| A balanced equation is one in which the number of different atoms on both the reactant and product sides are equal. Balancing chemical equations is necessary for the reaction to obey the law of conservation of mass. Balancing the chemical equation has no defined method and is purely a trial-and-error attempt. | |

| Difficult | |
| --- | --- |
| SA | |
| Translate the following statements into chemical equations and balance them. **(NCERT)**  (a) Hydrogen gas combines with nitrogen to form ammonia.  (b) Hydrogen sulphide gas burns in the air to give water and sulphur dioxide.  (c) Barium chloride reacts with aluminium sulphate to give Aluminium chloride and a precipitate of barium sulphate.  (d) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas. | |
| (a) Unbalanced: H2 + N2 → NH3  Balanced: 3H2 + N2 → 2NH3  (b) Unbalanced: H2S + O2 → H2O + SO2  Balanced: 2H2S + 3O2 → 2H2O + 2SO2  (c) Unbalanced: BaCl2 + Al2(SO4)3 → AlCl3 + BaSO4  Balanced: 3BaCl2 + Al2(SO4)3 → 2AlCl3 + 3BaSO4  (d) Unbalanced: K + H2O → KOH + H2  Balanced: 2K + 2H2O → 2KOH + H2 | |

| Medium | |
| --- | --- |
| SA | |
| Balance the following chemical equations. **(NCERT)**  (a) HNO3 + Ca(OH)2 → Ca(NO3)2 + H2O  (b) NaOH + H2SO4 → Na2SO4 + H2O  (c) NaCl + AgNO3 → AgCl + NaNO3  (d) BaCl2 + H2SO4 → BaSO4 + HC | |
| (a) 2HNO3 + Ca(OH)2 → Ca(NO3)2 + 2H2O  (b) 2NaOH + H2SO4 → Na2SO4 + 2H2O  (c) NaCl + AgNO3 → AgCl + NaNO3  (d) BaCl2 + H2SO4 → BaSO4 + 2HCl | |

| SA | |
| --- | --- |
| Write the balanced chemical equation for the following reactions. **(NCERT)**  Calcium hydroxide + Carbon dioxide —> Calcium carbonate + Water  Zinc + Silver nitrate —> Zinc nitrate + Silver  Aluminium + Copper chloride —> Aluminium chloride + Copper  Barium chloride + Potassium sulphate —> Barium sulphate + Potassium chloride | |
| 2Ca(OH)2 + 2CO2 → 2CaCO3 + 2H2O  Zn + 2AgNO3 → Zn(NO3)2 + 2Ag  2Al + 3CuCl2 → 2AlCl3 + 3Cu  BaCl2 + K2SO4 → BaSO4 + 2KCl | |

| Medium | |
| --- | --- |
| LA | |
| State the difference between balanced and unbalanced chemical equations. | |
| | Balanced chemical equations | Unbalanced chemical equations | | --- | --- | | A balanced chemical equation has an equal number of atoms of different elements on the side of reactants and products. | An unbalanced chemical equation has an unequal number of atoms of one or more elements in the reaction. | | In a balanced chemical equation, the sum of the masses of the reactants is equal to the sum of the masses of the products. | In an unbalanced chemical equation, the sum of the masses of the reactants is not equal to the sum of the masses of the products. | | It obeys the law of conservation of mass | It does not obey the law of conservation of mass | | Example:  **→ +**  Here, the number of Zn, H, S and O are the same in both reactants and products' sides. | Example:  **→**  Here, one oxygen atom is more on the reactant's side than on the product's side: it means one atom of oxygen is being destroyed, which is a violation of the law of conservation of mass. | | |

| Medium | |
| --- | --- |
| LA | |
| (a) What are the various ways in which a chemical equation can be made more informative? (b) Write a balanced chemical equation from the following information: An aqueous calcium hydroxide solution (lime water) reacts with carbon dioxide gas to produce a solid calcium carbonate precipitate and water. | |
| (a) A chemical equation can be made more informative :  (i) By indicating the physical states of the reactants and products.  ii) By indicating the heat changes taking place in the reaction.  iii) By indicating the "conditions" under which the reaction takes place.  (b) An aqueous calcium hydroxide solution (lime water) reacts with carbon dioxide gas to produce a solid calcium carbonate precipitate and water.  **→ +** | |

| Difficult | |
| --- | --- |
| HOTS | |
| Write a balanced equation for the following reaction: Methane burns in oxygen to form carbon dioxide and water. Write the answer in steps. | |
| This reaction can be written in the form of a word equation as:  → +  Methane + Oxygen→ carbon dioxide + water  We will use the hit and trial method to balance the given equation:w  Step I: We will first list out the number of atoms of different elements present in the given equation.   | Element | Number of atoms in reactants(LHS) | Number of atoms in product(RHS) | | --- | --- | --- | | C | 1 | 1 | | H | 4 | 2 | | O | 2 | 3 |   Step II:  Here we select because it contains the maximum number of atoms and we also select the element hydrogen in it because there are four hydrogen atoms( only in the LHS).   | Atoms of hydrogen | In reactants | In products | | --- | --- | --- | | Initial | 4(in ) | 4 in | | To balance | 4 | 2X2 |   Now the partly balanced equation becomes:  → +  Step III: Now oxygen atoms are left unbalanced. There are 4 oxygen atoms( only in the RHS).   | Atoms of oxygen | In reactants | In products | | --- | --- | --- | | Initial | 2 (in ) | 4( in + | | To balance | 2X2 | 4 |   Now the partly balanced equation becomes:  → +  Step IV: The numbers of atoms of elements on both sides are equal. Therefore, this equation is now balanced: → +  Step V: The above equation can be made more informative by indicating the physical states of the reactants and products as well as the heat changes taking place in the reaction as  → (g) + (g) + Heat | |

| Easy | |
| --- | --- |
| Assertion | |
| Assertion: The balancing of chemical equations is based on the law of conservation of mass.  Reason: Total mass of reactants is equal to total mass of products. | |
| 1 | If both Assertion and Reason are correct and Reason is the correct explanation of Assertion |
| 2 | If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. |
| 3 | If Assertion is correct but Reason is incorrect. |
| 4 | If Assertion is incorrect but Reason is correct. |
| 5 | If both Assertion and Reason are incorrect |
| 1 | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| In a reversible reaction both reactants and products are separated from each other by using <answer> sign. | |
| ⇋ | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| In a chemical equation, the symbol <answer> indicates to produce. | |
| → | |

| Easy | |
| --- | --- |
| fill-blank | |
| The symbol *aq* in a chemical equation represents <answer>. | |
| Aqueous reaction | |
|  | |

| Medium | |
| --- | --- |
| Number | |
| The following equation is unbalanced, after balancing the equation what will be the value of x? | |
| 2 | |
| After balancing the equation will be | |

| Medium | |
| --- | --- |
| Number | |
| In the reaction  How many moles of NO2 are produced when 2 moles of N2O5 are dissociated? | |
| 4 | |
| After balancing the equation will be | |

| Medium | |
| --- | --- |
| Number | |
| value of (x+y) is | |
| 5 | |
| The balanced chemical equation is | |

**Topic 3: Types of Chemical Reactions**

| Easy | |
| --- | --- |
| MCQ | |
| One of the following is an exothermic reaction. That is: | |
| 1 | Electrolysis Of Water |
| 2 | Conversion Of Limestone Into Quicklime |
| 3 | Process Of Respiration |
| 4 | Process Of Photosynthesis |
| 3 | |
| As heat energy is emitted during respiration, it is an exothermic reaction that keeps our body temperature stable. | |

| Easy | |
| --- | --- |
| MCQ | |
| The chemical reaction between quicklime and water is characterised by: | |
| 1 | Evolution of hydrogen gas |
| 2 | formation of slaked lime precipitate |
| 3 | Change in temperature of mixture |
| 4 | Change in colour of the product |
| 3 | |
| Chemically quick lime is calcium oxide, it produces calcium hydroxide or slaked lime when it is reacted with water and responds vigorously by producing large amounts of heat, It is an exothermic reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| The reaction | |
| 1 | Displacement Reaction |
| 2 | Combination Reaction |
| 3 | Decomposition Reaction |
| 4 | None Of The Above Reaction |
| 3 | |
| It is a decomposition reaction which means a single type of chemical compound breaks down into two or more elements or new compounds. | |

| Easy | |
| --- | --- |
| MCQ | |
| On passing current to an acidified water we get hydrogen and oxygen. This is: | |
| 1 | Oxidation Reaction |
| 2 | Thermal Decomposition |
| 3 | Electrolysis |
| 4 | None Of The Above |
| 3 | |
| Electrolysis occurs when an electric current is run through acidified water. Water breaks down into hydrogen and oxygen in this process. While some positive ions will travel to the cathode, some will move to the anode. At the cathode, hydrogen gas will develop. | |

| Easy | |
| --- | --- |
| MCQ | |
| Which of the following can be decomposed by the action of light? | |
| 1 | NaCl |
| 2 | KCl |
| 3 | AgCl |
| 4 | CuCl |
| 3 | |
| AgCl can be decomposed by the action of light. | |

| Easy | |
| --- | --- |
| MCQ | |
| The decomposition of silver chloride occurs by | |
| 1 | Heat |
| 2 | Sunlight |
| 3 | Water |
| 4 | Electricity |
| 2 | |
| Silver halides especially Silver chloride and Silver bromide undergo decomposition in presence of sunlight to produce silver metal and a halogen gas (chlorine or bromine gas). Thus Silver chloride undergoes decomposition in the presence of sunlight. | |

| Medium | |
| --- | --- |
| MCQ | |
| One of the following is an endothermic reaction. this is: | |
| 1 | Combination of carbon and oxygen to form carbon monoxide |
| 2 | Combination of nitrogen and oxygen to form nitrogen monoxide |
| 3 | Combination of glucose and oxygen to form carbon dioxide and water |
| 4 | Combination of zinc and hydrochloric acid to form zinc chloride and hydrogen |
| 2 | |
| This reaction occurs when nitrogen and oxygen are heated at very high temperatures like  3000℃ | |

| Easy | |
| --- | --- |
| MCQ | |
| What happens when dilute hydrochloric acid is added to iron filings? **(NCERT)** | |
| 1 | Hydrogen gas and iron chloride are produced. |
| 2 | Chlorine gas and iron hydroxide are produced. |
| 3 | No reaction takes place. |
| 4 | Iron salt and water are produced. |
| 1 | |
| When dilute Hydrochloric acid is added to iron filings, iron chloride & hydrogen gas are produced. In this reaction, iron displaces hydrogen from hydrochloric acid to form iron chloride and hydrogen gas. | |

| Medium | |
| --- | --- |
| MCQ | |
| Fe2O3 + 2Al → Al2O3 + 2Fe **(NCERT)**  The above reaction is an example of | |
| 1 | Combination Reaction |
| 2 | Double Displacement Reaction |
| 3 | Decomposition Reaction |
| 4 | Displacement Reaction |
| 4 | |
| The given equation is a displacement reaction in which Fe of Fe2O3 has been displaced by Al | |

| Medium | |
| --- | --- |
| MCQ | |
| A white precipitate can be obtained by adding dilute sulphuric acid to: | |
| 1 | CuSO4 solution |
| 2 | NaCl solution |
| 3 | BaCl2 solution |
| 4 | Na2SO4 solution |
| 3 | |
| When dilute sulphuric acid reacts with barium chloride, barium sulphate is produced along with HCl gas. The resulting barium sulphate is a white, insoluble precipitate. | |

| Medium | |
| --- | --- |
| MCQ | |
| A white precipitate will be formed if we add common salt solution to : | |
| 1 | Ba(NO3)2 solution |
| 2 | KNO3 solution |
| 3 | AgNO3 solution |
| 4 | Mg(NO3)2 solution |
| 3 | |
| Sodium chloride on reaction with silver nitrate produces silver chloride which is a white precipitate. | |

| Easy | |
| --- | --- |
| MCQ | |
| The removal of oxygen from a substance is called: | |
| 1 | Oxidation |
| 2 | Corrosion |
| 3 | Reduction |
| 4 | Rancidity |
| 3 | |
| The removal of oxygen from a substance is called reduction. | |

| Medium | |
| --- | --- |
| MCQ | |
| Consider the following equation of the chemical reaction of a metal m :  4M + 3O2 → 2M2O3 This equation represents : | |
| 1 | Combination reaction as well as reduction reaction |
| 2 | Decomposition reaction as well as oxidation reaction |
| 3 | Oxidation reaction as well as displacement reaction |
| 4 | Combination reaction as well as oxidation reaction |
| 4 | |
| The above reaction is both combination reaction as well as oxidation reaction as M is combining with O and M is oxidised by gaining O. | |

| Easy | |
| --- | --- |
| MCQ | |
| In the context of redox reactions, the removal of hydrogen from a substance is known as : | |
| 1 | Oxidation |
| 2 | Dehydration |
| 3 | Reduction |
| 4 | Dehydrogenation |
| 1 | |
| Removal of hydrogen from a substance is known as oxidation. | |

| Medium | |
| --- | --- |
| MCQ | |
| You are given the following chemical equation: Mg(s) + CuO(s) → MgO(s) + Cu(s) This equation represents: | |
| 1 | Decomposition reaction as well as displacement reaction |
| 2 | Combination reaction as well as double displacement reaction |
| 3 | Redox reaction as well as displacement reaction |
| 4 | Double displacement reaction as well as redox reaction |
| 3 | |
| Here Mg is oxidised(addition of oxygen) and CuO is reduced (removal of oxygen) so it is redox. Since only Oxygen is displaced it is a displacement reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| The following reaction is an example of a  4NH3(g) + 5O2(g) → 4NO (g) + 6H2O (g)  (i) displacement reaction  (ii) combination reaction  (iii) redox reaction  (iv) neutralisation reaction | |
| 1 | (i) and (iv) |
| 2 | (ii) and (iii) |
| 3 | (i) and (iii) |
| 4 | (iii) and (iv) |
| 3 | |
| 4NH3(g) + 5O2(g) → 4NO (g) + 6H2O (g)is an example of displacement as well as redox reaction. Oxygen displaces hydrogen from ammonia. Hence, this is a displacement reaction. Nitrogen of ammonia is getting oxidised with the addition of oxygen. This is also an example of a redox reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following statements about the given reaction are correct?  3Fe(s) + 4H2O (g) → Fe3O4(s) + 4H2(g)  (i) Iron metal is getting oxidised  (ii) Water is getting reduced  (iii) Water is acting as reducing agent  (iv) Water is acting as oxidising agent | |
| 1 | (i), (ii)and (iii) |
| 2 | (iii) and (iv) |
| 3 | (i), (ii)and (iv) |
| 4 | (ii) and (iv) |
| 3 | |
| In the given reaction, water is getting reduced but it is oxidising iron to iron oxide. So, water is acting as an oxidising agent.  The substance which oxidises the other substance in a chemical reaction is known as an oxidising agent. Likewise, the substance which reduces the other substance in a chemical reaction is known as a reducing agent. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following are exothermic processes?  (i) Reaction of water with quicklime  (ii) Dilution of an acid  (iii) Evaporation of water  (iv) Sublimation of camphor (crystals) | |
| 1 | (i) and (ii) |
| 2 | (ii) and (iii) |
| 3 | (i) and (iv) |
| 4 | (iii) and (iv) |
| 1 | |
| Calcium hydroxide is created when water combines with quick lime, coupled with the evolution of heat. As a result, it is exothermic.  **→ +**  Heat  Diluting a concentrated acid is a very exothermic process.  H2SO4 + H2O ⟶ H3O+ + HSO4– + Heat | |

| Medium | |
| --- | --- |
| MCQ | |
| Three beakers labelled as A, B and C each containing 25 mL of water were taken. A small amount of NaOH, anhydrous CuSO4and NaCl were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement(s) is(are) correct?  (i) In beakers A and B, an exothermic process has occurred.  (ii) In beakers A and B, an endothermic process has occurred.  (iii) In beaker C exothermic process has occurred.  (iv) In beaker C endothermic process has occurred. | |
| 1 | (i) only |
| 2 | (ii) only |
| 3 | (i) and (iv) |
| 4 | (ii) and (iii) |
| 3 | |
| The temperature will rise during exothermic processes whereas it will fall during endothermic ones. The chemical reaction in beakers A and B generates heat. The solution's temperature rises as a result. It falls within the exothermic process category. However, the temperature falls as a result of heat being absorbed by the water in the beaker C. We can categorise it as an endothermic process as a result. | |

| Medium | |
| --- | --- |
| MCQ | |
| A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation? | |
| 1 | KMnO4 is an oxidising agent, it oxidises FeSO4 |
| 2 | FeSO4acts as an oxidising agent and oxidises KMnO4 |
| 3 | The colour disappears due to dilution; no reaction is involved |
| 4 | KMnO4 is an unstable compound and decomposes in presence of FeSO4 to a colourless compound |
| 1 | |
| Potassium permanganate (KMnO4) in presence of dil. H2SO4 acts as a strong oxidising agent and oxidised ferrous sulphate to ferric sulphate. Hence, the purple colour fades and finally disappears. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which among the following is(are) double displacement reaction(s)?  (i) Pb + CuCl2→ PbCl2+ Cu  (ii) Na2SO4+ BaCl2→ BaSO4+ 2NaCl  (iii) C + O2 → CO2  (iv) CH4+ 2O2→ CO2+ 2H2O | |
| 1 | (i) and (iv) |
| 2 | (ii) only |
| 3 | (i) and (ii) |
| 4 | (iii) and (iv) |
| 2 | |
| A double Displacement Reaction is a reaction where simultaneously two elements or compounds replace each other.  Na2SO4 (aq) + BaCl2 → BaSO4↓ (s) + 2 NaCl (aq) | |

| Medium | |
| --- | --- |
| MCQ | |
| Which among the following statement(s) is(are) true? Exposure of silver chloride 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 | |
| 1 | (i) only |
| 2 | (i) and (iii) |
| 3 | (ii) and (iii) |
| 4 | (iv) only |
| 1 | |
| When silver chloride is exposed to light, it decomposes to form silver metal and chlorine gas.    White colour of silver chloride changes to grey due to the formation of silver metal. | |

| Medium | |
| --- | --- |
| MCQ | |
| Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed?  (i) It is an endothermic reaction  (ii) It is an exothermic reaction  (iii) The pH of the resulting solution will be more than seven  (iv) The pH of the resulting solution will be less than seven | |
| 1 | (i) and (ii) |
| 2 | (ii) and (iii) |
| 3 | (i) and (iv) |
| 4 | (iii) and (iv) |
| 2 | |
| Slaking of lime is an exothermic reaction because heat is given out. The resulting compound, Ca(OH)2 , is basic in nature and thus, its pH value is greater than seven. | |

| Difficult | |
| --- | --- |
| MCQ | |
| Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?  (i) Displacement reaction  (ii) Precipitation reaction  (iii) Combination reaction  (iv) Double displacement reaction | |
| 1 | (i) only |
| 2 | (ii) only |
| 3 | (iv) only |
| 4 | (ii) and (iv) |
| 3 | |
| Since ammonium and barium are being displaced from their respective salts, the reaction is an example of a double displacement reaction. | |

| Medium | |
| --- | --- |
| Medium | |
| MCQ | |
| Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is | |
| 1 | 1:1 |
| 2 | 2:1 |
| 3 | 4:1 |
| 4 | 1:2 |
| 2 | |
| Water undergoes decomposition during electrolysis and forms hydrogen and oxygen gas in the ratio 2:1 by volume. The reaction occurs as follows:  2H2O(l) → 2H2(g) + O2(g) | |

| Easy | |
| --- | --- |
| MCQ | |
| Which of the following is(are) an endothermic process(es)?  (i) Dilution of sulphuric acid  (ii) Sublimation of dry ice  (iii) Condensation of water vapours  (iv) Evaporation of water | |
| 1 | (i) and (iii) |
| 2 | (ii) only |
| 3 | (iii) only |
| 4 | (ii) and (iv) |
| 4 | |
| The chemical reaction in which the heat is absorbed is known as an Endothermic reaction. Examples are melting ice cubes and melting solid salts. In processes such as sublimation of dry ice and evaporation of water the heat is being absorbed. Thus, these processes are endothermic processes. | |

| Medium | |
| --- | --- |
| MCQ | |
| In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate? | |
| 1 | Lead sulphate(insoluble) |
| 2 | Lead acetate |
| 3 | Ammonium nitrate |
| 4 | Potassium sulphate |
| 2 | |
| Lead acetate because lead sulphate being insoluble will not form aqueous solution. Other salts ammonium nitrate and potassium sulphate do not possess the lead ion, therefore lead iodide cannot be formed using them. | |

| Medium | |
| --- | --- |
| MCQ | |
| The following reaction is used for the preparation of oxygen gas in the laboratory  Which of the following statement(s) is(are) correct about the reaction? | |
| 1 | It is a decomposition reaction and endothermic in nature |
| 2 | It is a combination reaction |
| 3 | It is a decomposition reaction and accompanied by release of heat |
| 4 | It is a photochemical decomposition reaction and exothermic in nature |
| 1 | |
| In the above reaction, potassium chlorate( KClO3 ) decomposes to form potassium chloride(KCl) and oxygen( O2 ). Also as shown in the equation, heat is supplied for the reaction to take place. Therefore, it is a decomposition reaction which is also endothermic in nature. | |

| Difficult | |
| --- | --- |
| MCQ | |
| Which of the following reactions is a redox reaction as well as displacement reaction? | |
| 1 | 2 HgCl2 + SnCl2 →Hg2Cl2 + SnCl4 |
| 2 | ZnO+ C → Zn +CO |
| 3 | 2Al + 6HCl → 2AlCl3 + 3H2 |
| 4 | H2S + Cl2 → 2HCl + S |
| 2 | |
| An oxidation-reduction reaction (or redox reaction) is any chemical reaction in which the oxidation number of a molecule, atom or ion changes by gaining or losing an electron. A redox reaction must involve a change in oxidation number for two of the elements involved in the reaction. The oxidised element increases in oxidation number, while the reduced element decreases in oxidation number. | |

| Medium | |
| --- | --- |
| MCQ | |
| Fe2O3 + 2Al → Al2O3 + 2 Fe  The above reaction is an example of a | |
| 1 | Combination reaction |
| 2 | Double displacement reaction |
| 3 | Decomposition reaction |
| 4 | Displacement reaction |
| 4 | |
| A displacement reaction is one wherein the atom or a set of atoms is displaced by another atom in a molecule. Aluminium being more reactive than iron, displaces Iron and results in the formation of the aluminium oxide. | |

| Easy | |
| --- | --- |
| MCQ | |
| Oxidation and reduction are | |
| 1 | Gain of electrons and loss of electrons |
| 2 | Gain of electrons and loss of electrons respectively |
| 3 | Loss of electrons and gain of electrons respectively |
| 4 | Loss of electrons and loss of electrons |
| 3 | |
| Oxidation is the loss of electrons by an atom or a molecule. In contrast, reduction is the gain of electrons by an atom or a molecule. Both the processes are interrelated to each other. | |

| Medium | |
| --- | --- |
| MCQ | |
| In the reaction PbO + C → Pb + CO | |
| 1 | PbO is oxidised |
| 2 | C acts as an oxidising agent |
| 3 | C acts as a reducing agent. |
| 4 | This reaction does not represent a redox reaction. |
| 3 | |
| Here, carbon oxidises itself to form CO2 and reduces PbO to form Pb. Therefore, C acts as a reducing agent. This is a redox reaction. | |

| Easy | |
| --- | --- |
| MCQ | |
| When iron nails are put in a solution of CuSO4, | |
| 1 | Copper metal is displaced |
| 2 | The blue colour turns light green |
| 3 | The copper metal is deposited on the iron nails |
| 4 | All of the above |
| 3 | |
| When an iron nail is placed in a copper sulphate solution, iron displaces copper from copper sulphate solution forming iron sulphate. | |

| Medium | |
| --- | --- |
| MCQ | |
| Ferric oxide reacts with aluminium metal upon heating to form aluminium oxide and iron. In this reaction, Fe2O3 acts | |
| 1 | Reducing agent |
| 2 | Oxidising agent |
| 3 | Both as oxidising and reducing agent |
| 4 | Above reaction is not a redox reaction |
| 2 | |
| Since Fe2O3 is reduced by Al metal so Fe2O3 is an oxidising agent | |

| Easy | |
| --- | --- |
| MCQ | |
| During the reaction of Zn with H2SO4 | |
| 1 | Zn loses electrons |
| 2 | Zn gains electrons |
| 3 | Zn gets reduced |
| 4 | Both (2) and (3) |
| 1 | |
| In the reaction Zn + H2SO4 → ZnSO4 + H2, zinc (Zn) is oxidised and hydrogen (H) is reduced. | |

| Medium | |
| --- | --- |
| MCQ | |
| Following reaction represents a redox reaction in this process  2Na + Cl → 2NaCl | |
| 1 | Na get oxidised |
| 2 | Cl2 get oxidised |
| 3 | Cl2 is oxidising agent |
| 4 | Both (1) and (3) |
| 4 | |
| Na is oxidised to Na+ and hence, Cl2 is the oxidiser. Cl2 is reduced to Cl– and therefore, Na is the reducer. | |

| Medium | |
| --- | --- |
| MCQ | |
| CaCO­3 (s) + Heat → CaO (s) + CO2 (g), this reaction is | |
| 1 | an endothermic reaction |
| 2 | an exothermic reaction |
| 3 | a reaction that is neither endothermic or exothermic |
| 4 | a reaction in which a catalyst is used. |
| 1 | |
| This is the thermal decomposition of limestone to calcium oxide(quick lime) and carbon dioxide on heating. A thermal decomposition reaction requires energy to be supplied to the reactants in the form of heat. | |

| Easy | |
| --- | --- |
| MCQ | |
| Photosynthesis is an example of | |
| 1 | an endothermic reaction |
| 2 | an exothermic reaction |
| 3 | the reaction in which plant absorb methane gas |
| 4 | the reaction in which plant get reduced |
| 2 | |
| During photosynthesis, the energy in the form of sunlight is absorbed by the green plants in order to prepare their food. Such a type of reaction in which energy is absorbed is called an endothermic reaction. | |

| Easy | |
| --- | --- |
| MCQ | |
| Consider the reaction: A + B →C + D + Heat  this is example of | |
| 1 | Reversible reaction |
| 2 | Endothermic reaction |
| 3 | Exothermic reaction |
| 4 | All of the above |
| 3 | |
| As heat is generated this is an exothermic reaction. | |

| Easy | |
| --- | --- |
| MCQ | |
| The reactions in which the energy needed in bond breaking in the reactant is less than the energy released when new bonds are formed resulting in products are | |
| 1 | Exothermic reaction |
| 2 | Endothermic reaction |
| 3 | Data insufficient |
| 4 | Redox reaction |
| 2 | |
| In endothermic reactions, more energy is absorbed when the bonds in the reactants are broken than is released when new bonds are formed in the products. | |

| Medium | |
| --- | --- |
| MCQ | |
| In a particular chemical reaction at 5000C and 1 atm pressure in the presence of catalyst (V2O5) the energy released is 182 kJ. We can say about this reaction that it is a/an | |
| 1 | Exothermic reaction |
| 2 | Endothermic reaction |
| 3 | Data insufficient |
| 4 | Redox reaction |
| 1 | |
| As heat is released/generated this is an exothermic reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| Haber’s process of ammonia synthesis, in which nitrogen and hydrogen gas react to give ammonia is an example of | |
| 1 | Endothermic reaction |
| 2 | Reversible reaction |
| 3 | Irreversible reaction |
| 4 | Data insufficient |
| 2 | |
| The Haber process is a reaction between nitrogen and hydrogen to form ammonia. The reaction is reversible because the forward and backward reactions occur simultaneously at the same rate. | |

| Easy | |
| --- | --- |
| MCQ | |
| Haber’s process of ammonia synthesis, in which nitrogen and hydrogen gas react to give ammonia is an example of | |
| 1 | Endothermic reaction |
| 2 | Reversible reaction |
| 3 | Irreversible reaction |
| 4 | Data insufficient |
| 2 | |
| The Haber process is a reaction between nitrogen and hydrogen to form ammonia. The reaction is reversible because the forward and backward reactions occur simultaneously at the same rate. | |

| Medium | |
| --- | --- |
| MCQ | |
| If the following reaction H2S (s) + Cl2 (g) → S(s) + 2HCl (g) , which of the following get oxidised | |
| 1 | H |
| 2 | H2S |
| 3 | Cl2 |
| 4 | Both (2) and (3) |
| 2 | |
| H2S is oxidised to S by losing hydrogen atoms. Cl2 is reduced to HCl by gaining hydrogen atoms. The substance which gets oxidised is called a reducing agent. Hence H2S is a reducing agent. The substance which gets reduced is called an oxidising agent. Hence Cl2 is an oxidising agent. | |

| Easy | |
| --- | --- |
| MCQ | |
| A brown mass of ferric chloride is formed on iron surface as a result of combination reaction between iron and chlorine, in this process | |
| 1 | Iron get oxidised |
| 2 | Iron get reduced |
| 3 | Iron get oxidised as well as reduced |
| 4 | It is not a redox process |
| 1 | |
| Iron gets oxidised in the above reaction. | |

| Easy | |
| --- | --- |
| MCQ | |
| Upon heating zinc oxide with carbon, zinc and carbon-monoxide are formed is the process | |
| 1 | ZnO get oxidised |
| 2 | C get reduced |
| 3 | ZnO acts as oxidising agent |
| 4 | C acts as oxidising agent |
| 3 | |
| Carbon is oxidised (due to loss of electrons) and Zinc is reduced (due to gain in electrons). | |

| Easy | |
| --- | --- |
| MCQ | |
| Ammonia is formed by a combination of nitrogen and hydrogen gas, in the process. | |
| 1 | Ammonia is reduction product of N2 |
| 2 | Ammonia is oxidation product of H2 |
| 3 | Nitrogen acts as oxidising agent |
| 4 | All of these |
| 3 | |
| When hydrogen gas combines with nitrogen to form ammonia the following chemical reaction will take place. Our equilibrium reaction will be  N2(g) + 3H2(g) ⇔ 2NH3(g) + Heat. In this case, Hydrogen and nitrogen react together to form ammonia. | |

| Easy | |
| --- | --- |
| MCQ | |
| Decomposition reaction is | |
| 1 | Mostly exothermic |
| 2 | Mostly endothermic |
| 3 | That reaction in which one substance gets decomposed into simpler substances |
| 4 | Both (2) and (3) |
| 2 | |
| Carbon is oxidised (due to loss of electrons) and Zinc is reduced (due to gain in electrons). | |

| Easy | |
| --- | --- |
| MCQ | |
| An equilibrium is attained from | |
| 1 | Backward direction only |
| 2 | Forward direction only |
| 3 | From either of the side |
| 4 | Reactant side only |
| 3 | |
| The equilibrium state can be obtained from both sides of the chemical reaction. | |

| Medium | |
| --- | --- |
| MCQ | |
| Acid + Base →Salt + Water.  This reaction is known as | |
| 1 | Neutralisation reaction |
| 2 | Decomposition reaction |
| 3 | Precipitation reaction |
| 4 | Displacement reaction |
| 1 | |
| A neutralisation reaction is when an acid and a base react to form water and a salt. | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following is a decomposition reaction? | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 3 | |
| A decomposition reaction is a chemical reaction where a single compound breaks down into two or more simpler substances. Here, KClO3 has been split into KCl and O2 molecules | |

| Easy | |
| --- | --- |
| MCQ | |
| Which of the following statements is incorrect? | |
| 1 | In oxidation, oxygen is added to a substance |
| 2 | In reduction, hydrogen is added to a substance |
| 3 | Oxidising agent is oxidised |
| 4 | Reducing agent is oxidised |
| 3 | |
| This statement is incorrect because an oxidising agent is a substance that causes oxidation in another substance by accepting electrons, and thus it itself gets reduced. | |

| Medium | |
| --- | --- |
| MCQ | |
| In the given reaction:  Hydrogen undergo | |
| 1 | Oxidation only |
| 2 | Both oxidation and reduction |
| 3 | Reduction only |
| 4 | None of these |
| 1 | |
|  | |

| Easy | |
| --- | --- |
| MCQ | |
| A reducing agent is a substance which can ? | |
| 1 | Donate proton |
| 2 | Accept electron |
| 3 | Donate electron |
| 4 | Accept proton |
| 3 | |
| A reducing agent is a substance that can donate electrons. | |

| Easy | |
| --- | --- |
| VSA | |
| Which type of chemical reaction does the general chemical reaction A+B → C represent? | |
| Combination reaction. | |

| Easy | |
| --- | --- |
| VSA | |
| State any two applications of decomposition reaction. | |
| Manufacture of cement and extraction of metals from their oxides, chlorides | |

| VSA | |
| --- | --- |
| Easy | |
| Define thermal decomposition reaction | |
| When a decomposition reaction is carried out by heating, it is calledthermal decomposition**.** | |

| Medium | |
| --- | --- |
| Medium | |
| VSA | |
| What is meant by displacement reaction? | |
| The chemical reaction in which a more reactive element displaces a less reactive element from compounds. | |

| Medium | |
| --- | --- |
| VSA | |
| What is meant by a double displacement reaction? | |
| The chemical reaction in which ions are exchanged between two reactants forming new compounds. | |

| Easy | |
| --- | --- |
| VSA | |
| Define redox reaction. | |
| A reaction in which one reactant undergoes oxidation whereas the other gets reduced | |

| Medium | |
| --- | --- |
| VSA | |
| Identify the compound oxidised in the following reaction. H2S (g) + Cl2 → S(s) + 2HCl (g) | |
| H2S is oxidised to S by losing hydrogen atoms. Thus, H2S is the reducing agent. | |

| Easy | |
| --- | --- |
| SA | |
| A solution of a substance ‘X’ is used for whitewashing. **(NCERT)**  (i) Name the substance ‘X’ and write its formula.  (ii) Write the reaction of the substance ‘X’ named in (i) above with water. | |
| (i)The substance ‘X’ which is used in whitewashing is quick lime or Calcium Oxide and its formula is CaO.  (ii) CaO + → Ca(OH | |

| Easy | |
| --- | --- |
| SA | |
| Why is respiration considered an exothermic process? Explain **(NCERT)** | |
| Respiration is considered an exothermic reaction because energy is released in this process. Glucose combines with oxygen present in our cells to form carbon dioxide and water along with energy. | |

| Medium | |
| --- | --- |
| SA | |
| Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions. **(NCERT)** | |
| A combination reaction is said to be the reaction between two or more molecules to form a larger molecule; whereas the decomposition reaction is defined as the splitting of larger molecules into two or smaller molecules. This essentially explains that the decomposition reaction is the opposite of the combination reaction.  In most cases, the decomposition reaction is endothermic since the heat from the surrounding or induced heat is used to break the bonds of the larger molecule. Few examples of decomposition reactions are:  ZnCO3 → ZnO + CO2  CaCO3 + Energy → CaO + CO2  2HgO → 2Hg + O2 | |

| Difficult | |
| --- | --- |
| SA | |
| Write one equation each for decomposition reactions where energy is supplied in the form of heat, light, or electricity. **(NCERT)** | |
| (a) Thermal decomposition reaction (Thermolysis)  Decomposition of potassium chlorate: When heated strongly, potassium chlorate decomposes into potassium chloride and oxygen. This reaction is used for the preparation of oxygen.  2KClO3 + Heat → 2KCl + 3O2  (b) Electrolytic decomposition reaction (Electrolysis)  Decomposition of sodium chloride: On passing electricity through molten sodium chloride, it decomposes into sodium and chlorine.  **→ +**  Sodium chloride Sodium metal Chlorine gas  (Molten)  (c) Photodecomposition reaction (Photolysis)  Decomposition of hydrogen peroxide: In the presence of light, hydrogen peroxide decomposes into water and oxygen. | |

| Medium | |
| --- | --- |
| SA | |
| What is meant by exothermic and endothermic reactions? Give examples. | |
| An endothermic reaction occurs when energy is absorbed from the surroundings in the form of heat. (Example: Photosynthesis, melting of ice, evaporation). Conversely, an exothermic reaction is one in which energy is released from the system into the surroundings. (Example: Explosions, concrete setting, nuclear fission, and fusion). | |

| SA | |
| --- | --- |
| What is the difference between displacement and double displacement reactions? Write relevant equations for the above. **(NCERT)** | |
| A displacement reaction is the one when a more reactive substance displaces a less reactive one from its salt solution whereas a double displacement reaction is the one where a mutual exchange of ions happens between two compounds.  In a displacement reaction, only a single displacement takes place whereas in the double displacement reaction, as the name suggests two displacements take place between the molecules.  Example:  Displacement reaction: Mg + 2HCl → MgCl2 + H2  Double displacement reaction: 2KBr + BaI2 → 2KI + BaBr2 | |

| Medium | |
| --- | --- |
| SA | |
| Why does the colour of copper sulphate solution change when an iron nail is dipped in it? **(NCERT)** | |
| When an iron nail is dipped in the copper sulphate solution, iron displaces copper from the copper sulphate because iron is more reactive than copper. Therefore the colour of the copper sulphate solution changes. The reaction is:  Fe + CuSO4 → FeSO4 + Cu | |

| Medium | |
| --- | --- |
| SA | |
| Give an example of a double displacement reaction other than the one given in the activity. **(NCERT)** | |
| The reaction between silver nitrate (AgNO3) and Sodium chloride (NaCl) is an example of a double displacement reaction. During the reaction negative and positive ions trade positions as a result in the formation of white silver chloride precipitate. The chemical reaction is given below.  Ag+ + NO3– + Na+ + Cl– → AgCl + Na+ + NO3– | |

| Medium | |
| --- | --- |
| SA | |
| Explain the following in terms of the gain or loss of oxygen with two examples each. **(NCERT)**  (a) Oxidation  (b) Reduction | |
| (a) In a chemical reaction, when oxygen is added to the element to form its respective oxide it is the element being oxidised. Example:  4Na(s) + O2(g) → 2Na2O(s)  H2S + O2 → H2O + SO2  (b) In a chemical reaction, when the oxygen is being removed from the compound then it is said to be reduced. Example:  CuO(s) + H2(g) → Cu(s) + H2O(l)  2HgO → 2Hg + O2 | |

| Medium | |
| --- | --- |
| SA | |
| A shiny brown-coloured element X on heating in the air becomes black. Name the element X and the black-coloured compound formed. **(NCERT)** | |
| The shiny brown-coloured element X is copper metal (Cu). When copper metal is heated in the air, it forms a black-coloured compound of copper oxide. So, the black-coloured compound is a copper oxide or copper (II) oxide, CuO.  2Cu(s) + O2(g) → 2CuO(s) | |

| Medium | |
| --- | --- |
| SA | |
| Identify the substances that are oxidised and the substances that are reduced in the following reactions. **(NCERT)**  (i) 4Na(s) + (g) → 2Na2O(s)  (ii) CuO(s) + (g) → Cu(s) + (l) | |
| The Sodium (Na) in the first equation is getting oxidised with the addition of Oxygen () and the Copper (Cu) in the second equation is reduced due to the addition of Hydrogen () | |

| Medium | |
| --- | --- |
| SA | |
| Which of the statements about the reaction below are incorrect? **(NCERT)**  2PbO(s) + C(s) → 2Pb(s) + CO2(g)  (a) Lead is getting reduced  (b) Carbon Dioxide is getting oxidised  (c) Carbon is getting oxidised  (d) Lead oxide is getting reduced  (i) (a) and (b)  (ii) (a) and (c)  (iii) (a), (b) and (c)  (iv) all | |
| (i) (a) and (b)  Explanation: (a) because Oxygen is being removed and (b) because the removed oxygen from Lead is added to the elemental Carbon. The Sodium (Na) in the first equation is getting oxidised with the addition of Oxygen () and the Copper (Cu) in the second equation is reduced due to the addition of Hydrogen () | |

| Medium | |
| --- | --- |
| LA | |
| (a) Define a combination reaction.  (b) Give one example of a combination reaction which is also exothermic. | |
| (a) The reaction in which two or more reactants combine to form one product is called a combination reaction. It is represented as X+ Y → XY.  (b) The reaction in which heat is released is known as an exothermic reaction:  Example: Carbon combines with oxygen to give carbon dioxide, and heat energy is released during the process.  **→ +** heat  (Carbon ) (Oxygen) (Carbon dioxide) | |

| Medium | |
| --- | --- |
| LA | |
| (a)What happens when silver chloride is exposed to sunlight? Write a chemical equation for this reaction. Also, give one use of such a reaction.  (b)Where can you see a similar reaction? Write a chemical equation for that reaction. | |
| When silver chloride is exposed to light, it decomposes to form silver metal and chlorine gas.  **→ +**  Silver chloride Silver Chlorine  (White) (Greyish white) (Yellowish-green)  In this reaction, the white colour of silver chloride changes to greyish white due to the formation of silver metal. The decomposition of silver chloride is caused by light. (It can be sunlight or bulb light). This reaction is used in black-and-white photography.  (b)We can see a similar reaction when silver bromide is exposed to light, it decomposes to form silver metal and bromine vapours.In this reaction, the pale yellow colour of silver bromide changes to greyish-white due to the formation of silver metal.  **→ +**  Silver Bromide Silver Bromide  (Pale yellow) (Greyish white) (Red-brown) | |

| Medium | |
| --- | --- |
| LA | |
| Below are given three chemical reactions :  (i) 2KBr (aq) + Cl2 (aq)→ 2KCl (aq) + Br2 (aq)  (ii) Fe (s) + S (s) → FeS (s)  (iii)Mg (s) + 2HCl (aq) → MgCl2 (aq) + H2 (g)  Which is the combination reaction and which is the displacement reaction? | |
| (i) In the first reaction, potassium bromide solution reacts with chlorine solution to form potassium chloride solution and bromine. So, in this reaction, chlorine is displacing bromine from potassium bromide to form potassium chloride and bromine is set free. Thus, it is a displacement reaction.  (ii) In the second reaction, iron combines with sulphur to form iron (II) sulphide. So, it is a combination reaction.  (iii) In the third reaction, magnesium ions react with hydrochloric acid to give an aqueous solution of magnesium chloride and hydrogen gas. So, this is a displacement reaction. | |

| Medium | |
| --- | --- |
| LA | |
| (a)What happens when a silver nitrate solution is added to a sodium chloride solution?  (b) Write the equation for the reaction which takes place.  (c) Name the type of reaction involved. | |
| (a)When a solution of silver nitrate is added to a solution of sodium chloride, the silver ions combine with the chloride ions to form a precipitate of silver chloride. The sodium and the nitrate ions are nonparticipating spectator ions.  (b) The equation is given as:  AgNO3 (aq) + NaCl (aq) → AgCl (s)+ NaNO3 (aq)  (c) It is a double displacement reaction as an exchange of ions takes place in this reaction. | |

| Easy | |
| --- | --- |
| LA | |
| In the refining of silver, the recovery of silver from silver nitrate solution involves displacement reaction by Copper metal. Write down the reaction involved. **(NCERT)** | |
| Cu(s) + 2AgNO3(aq) → Cu(NO3)2(aq) + 2Ag | |

| Medium | |
| --- | --- |
| LA | |
| What do you mean by a precipitation reaction? Explain by giving examples. **(NCERT)** | |
| When two solutions containing soluble salts are combined, a double displacement reaction takes place in which the ions are exchanged between the compounds. When one of such compounds formed is in solid form (that is insoluble in aqua) then it settles down at the bottom of the container. This solid is known as the precipitate and the respective reaction is termed as the precipitation reaction. Few examples of precipitation reactions are:  CdSO4(aq) + K2S(aq) → CdS(s) + K2SO4(aq)  2NaOH(aq) + MgCl2(aq) → 2NaCl(aq) + Mg(OH)2(s) | |

| Difficult | |
| --- | --- |
| LA | |
| (a) Define oxidation and reduction.  (b) Name the substance oxidised and substance reduced in the following reaction:  + | |
| (a) The addition of oxygen to a substance or the removal of hydrogen from a substance is called oxidation and the addition of hydrogen to a substance or the removal of oxygen from a substance is calledreduction.  (b) (i) Here, it is changing into S. This is the removed oxygen from . By definition, the removal of oxygen is called reduction. Thus, it is being reduced to S. So, the substance being reduced is sulphur dioxide, .  (ii) is changing into S. This is the removal of hydrogen from . By definition, the removal of hydrogen is known as oxidation. Thus, is being oxidised to S. So, the substance being oxidised is hydrogen sulphide, | |

| Medium | |
| --- | --- |
| LA | |
| (a) Define oxidising agent and reducing agent.  (b) Select the oxidising agent and the reducing agent from the following reaction:  + | |
| (a) The substance which gives oxygen for oxidation and the substance which removes hydrogen is called an oxidising agent andthe substance which gives hydrogen for reduction and the substance which removes oxygen is called areducing agent.  (b) (i) is changing into S. This is the removal of hydrogen from . By definition, the removal of hydrogen is known as oxidation, therefore, hydrogen sulphide is being oxidised to sulphur. Iodine is removing the hydrogen from , so iodine is the oxidising agent.  (ii) I2 is changing into HI. This is the addition of hydrogen to iodine. By definition, the addition of hydrogen is known as reduction, therefore, iodine is being reduced to hydrogen iodide. Hydrogen sulphide is supplying the hydrogen required for reduction, so hydrogen sulphide is the reducing agent. | |

| Difficult | |
| --- | --- |
| LA | |
| Write chemical equation for reactions taking place when carried out with the help of  (a) Iron reacts with steam  (b) Magnesium reacts with dil HCl  (c) Copper is heated in air. | |
| (a)  (b)  (c) | |

| Medium | |
| --- | --- |
| HOTS | |
| When water is added gradually to a white solid X, a hissing sound is heard and a lot of heat is produced forming a product Y. A suspension of Y in water is applied to the walls of a house during whitewashing. A clear solution of Y is also used for testing carbon dioxide gas in the laboratory.  (a) What could be solid X? Write its chemical formula.  (b) What could be product Y? Write its chemical formula.  (c) What is the common name of the solution of Y which is used for testing carbon dioxide gas?  (d) Write a chemical equation of the reaction which takes place on adding water to solid X.  (e) Which characteristic of chemical reactions is illustrated by this example? | |
| a) Solid X is Calcium oxide and its formula is CaO. b) Product Y is Calcium hydroxide and its formula is Ca(OH)2c) The common name of the solution of Y which is used for testing carbon dioxide gas is Lime water d) ​e) The characteristic of chemical reactions is temperature change. | |

| Difficult | |
| --- | --- |
| HOTS | |
| Write the chemical equation for the following reaction:  (i) Phosphorus burns in the presence of chlorine to form phosphorus pentachloride.  (ii) Burning of natural gas.  (iii) The process of respiration. | |
| (i)  (Phosphorus) (chlorine) (phosphorus pentachloride)  (ii) → ) + heat  (Methane) (Oxygen) (Carbon dioxide) (water)  (iii)→ ) + energy  (Glucose) (Oxygen) (Carbon dioxide) (water) | |

| Medium | |
| --- | --- |
| HOTS | |
| When a green iron salt is heated strongly, its colour finally changes to brown and the odour of burning sulphur is given out.  (a) Name the iron salt.  (b) Name the type of reaction that takes place during the heating of iron salt.  (c) Write a chemical equation for the reaction involved. | |
| a) The iron salt is ferrous sulphate ()  b) The type of reaction that takes place during the heating of iron salt is the decomposition reaction. c) The balanced chemical equation for the reaction involved is: **→ + +** | |

| Difficult | |
| --- | --- |
| HOTS | |
| A red-brown metal X forms a salt XSO4. When hydrogen sulphide gas is passed through an aqueous solution of XSO4, then a black precipitate of XS is formed along with sulphuric acid solution.  (a) What could the salt XSO4 be?  (b) What is the colour of salt XSO4?  (c) Name the black precipitate XS.  (d) By using the formula of the salt obtained in (a) above, write an equation of the reaction which takes place when hydrogen sulphide gas is passed through its aqueous solution.  (e) What type of chemical reaction takes place in this case? | |
| (a) Salt is Copper sulphate (**)** b) salt is blue in colour. c) The black precipitate XS is Copper sulphide (CuS).  (d)The balanced chemical equation for the reaction involved is:  **+ → +**  e) Double displacement reaction takes place as there is a mutual exchange of ions. | |

| Medium | | | |
| --- | --- | --- | --- |
| Matrix | | | |
| Match the following reactions and the gas evolved in the process of reaction | | | |
| Column I | | Column II | |
| 1. SO2 | | 1. Reaction between zinc and sulphuric acid | |
| 1. H2 | | 1. Reaction between manganese dioxide and sulphuric acid | |
| 1. CO2 | | 1. Reaction between copper and conc sulphuric acid on heating | |
| 1. O2 | | 1. Reaction of sulphuric acid on marble | |
| 1. NH3 | | 1. Reaction between magnesium nitride and water | |
| 1:3,2:1,3:4,4:2,5:5 | | | |
|  | | | |

| Medium | | | |
| --- | --- | --- | --- |
| Matrix | | | |
| Match the following reactions with the observation | | | |
| Column I | | Column II | |
| 1. KI + Cl2 ⟶ | | 1. Violet solution | |
| 1. KBr + Cl2 ⟶ | | 1. Yellow ppt | |
| 1. PbNO3 + KI ⟶ | | 1. Light green solution | |
| 1. CuSO4 + Fe ⟶ | | 1. Light brown solution | |
| 1. Zn + HCl ⟶ | | 1. Evolution of gas | |
| 1:1,2:4,3:2,4:3,5:5 | | | |
| 1. KI+Cl2→KCl+I2 Iodine gives violet colour 2. Cl2 + KBr→KCl + Br2 Bromine gives light brown colour 3. Lead iodide gives yellow colour 4. Iron sulphate gives green colour 5. Hydrogen is the gas that evolved. | | | |

| Medium | |
| --- | --- |
| Assertion | |
| Assertion: Stannous chloride is a powerful oxidising agent which oxidises mercuric chloride to mercury  Reason: Stannous chloride gives grey precipitate with mercuric chloride, but stannic chloride does not do so. | |
| 1 | If both Assertion and Reason are correct and Reason is the correct explanation of Assertion |
| 2 | If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. |
| 3 | If Assertion is correct but Reason is incorrect. |
| 4 | If Assertion is incorrect but Reason is correct. |
| 5 | If both Assertion and Reason are incorrect |
| 3 | |
|  | |

| Medium | |
| --- | --- |
| Assertion | |
| Assertion: In a reaction  Zn is a reductant but itself gets oxidised.  Reason: In a redox reaction, oxidant is reduced by accepting electrons and reductant is oxidised by losing electrons. | |
| 1 | If both Assertion and Reason are correct and Reason is the correct explanation of Assertion |
| 2 | If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. |
| 3 | If Assertion is correct but Reason is incorrect. |
| 4 | If Assertion is incorrect but Reason is correct. |
| 5 | If both Assertion and Reason are incorrect |
| 1 | |
| An oxidising agent (also oxidant) is the element or compound in an oxidation-reduction (redox) reaction that accepts an electron from another species. Because the oxidising agent is gaining electrons (and is thus often called an electron acceptor), it is said to have been reduced.  A reductant is a reactant that donates electrons to other reactants during a redox reaction. | |

| Medium | |
| --- | --- |
| Assertion | |
| Assertion: A reducing agent is a substance which can either accept electrons.  Reason: A substance which helps in oxidation is known as a reducing agent | |
| 1 | If both Assertion and Reason are correct and Reason is the correct explanation of Assertion |
| 2 | If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. |
| 3 | If Assertion is correct but Reason is incorrect. |
| 4 | If Assertion is incorrect but Reason is correct. |
| 5 | If both Assertion and Reason are incorrect |
| 4 | |
| A reduce agent is a substance which oxidises itself but reduces other i.e., loses electrons. | |

| Easy | |
| --- | --- |
| fill-blank | |
| Combustion reactions are always <answer> in nature. | |
| Exothermic | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| Exothermic reactions are <answer> common than endothermic reactions. | |
| More | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| Decomposition reactions are <answer> of combination reactions | |
| Opposite | |
|  | |

| Medium | |
| --- | --- |
| fill-blank | |
| Fe + CuSO4 (aq) → FeSO4 (aq)+ <answer> | |
| Cu(s) | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| The chemical change involving iron and hydrochloric acid illustrates a <answer> reaction | |
| Displacement | |
|  | |

| Easy | |
| --- | --- |
| fill-blank | |
| In the type of reaction called <answer> two compounds exchange their positive and negative radicals. | |
| Double displacement reaction | |
|  | |

| Medium | |
| --- | --- |
| Number | |
| 1. Fe + S ⟶ FeS 2. CaO + CO2 ⟶ CaCO3 3. Ca(OH)2  CaO + H2O 4. Cu O + H2  Cu + H2O   Out of the four reaction given above, the number of combination reactions is/are: | |
| 2 | |
| (3) and (4) are decomposition and redox reactions, respectively. | |

| Medium | |
| --- | --- |
| Number | |
| How many reactions from the given reaction are endothermic reactions? | |
| 1 | |
| In (B) reaction, heat is absorbed and therefore it is an endothermic reaction. | |

| Medium | |
| --- | --- |
| Number | |
| Among the following reactions, the number of reaction(s) in which acts as reducing agent is (are) | |
| 1 | |
|  | |

| Medium | |
| --- | --- |
| Number | |
| Number of double displacement reactions among the following reaction are:  (i) +Cu  (ii)  (iii)  (iv) | |
| 2 | |
| (iii) and (iv) are double displacement reactions. | |

**Topic 4: Effects Of Oxidation Reactions**

| Easy | |
| --- | --- |
| MCQ | |
| The chemical reaction involved in the corrosion of iron metal is that of: | |
| 1 | Oxidation as well as displacement |
| 2 | Reduction as well as combination |
| 3 | Oxidation as well as combination |
| 4 | Reduction as well as displacement |
| 3 | |
| Corrosion takes place when iron metal reacts with oxygen in the presence of moisture to form hydrated iron oxide. Therefore, it is an oxidation reaction | |

| Easy | |
| --- | --- |
| MCQ | |
| The term used to indicate the development of unpleasant smell and taste in fat and oil containing foods due to aerial oxidation is: | |
| 1 | Acidity |
| 2 | Radioactivity |
| 3 | Rabidity |
| 4 | Rancidity |
| 4 | |
| The term is used to indicate the development of unpleasant smell and taste in fat and oil-containing foods due to aerial oxidation when they are kept exposed for a considerable time is rancidity. | |

| Medium | |
| --- | --- |
| MCQ | |
| In order to prevent the spoilage of potato chips, they are packed in plastic bags in an atmosphere of: | |
| 1 | Cl2 |
| 2 | H2 |
| 3 | N2 |
| 4 | O2 |
| 3 | |
| To prevent potato chips from spoiling, they are packed in plastic bags filled with nitrogen gas (N2). Nitrogen is stable and less reactive than other gases. It drives out oxygen and moisture, and prevents the oxidation of oils in the chips. This keeps the chips fresh and crisp. | |

| Easy | |
| --- | --- |
| MCQ | |
| Which of the following gases can be used for the storage of fresh samples of oil for a long time? | |
| 1 | Carbon dioxide or oxygen |
| 2 | Nitrogen or oxygen |
| 3 | Carbon dioxide or helium |
| 4 | Helium or nitrogen |
| 4 | |
| Helium, as well as nitrogen, can be used for storage of a fresh sample of an oil for a long time because they abstain the oil from rancidity. The contact of air and oil is prevented by using nitrogen or helium as blanketing gas. | |

| Medium | |
| --- | --- |
| MCQ | |
| Copper objects lose their lustre or shine after some time. The surface of these objects acquire a green coating of basic copper carbonate CuCO3.Cu(OH)2 which is called rust of copper. This is due to | |
| 1 | Attack of H2O (vap.) and CO2 present in the atmosphere on the surface of copper |
| 2 | Attack of H2O & O2 present in the atmosphere on the surface of copper |
| 3 | Attack of H2O, O2 & CO2 present in the atmosphere on the surface of copper |
| 4 | None of these |
| 3 | |
| Copper corrodes by oxidation in which reacts with oxygen in the air to form copper oxide. Copper oxide then combines with carbon dioxide to make copper carbonate, which gives it a green colour. Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and gains a green coat. | |

| Easy | |
| --- | --- |
| MCQ | |
| Rusting of iron is a chemical reaction. The reaction can be termed as | |
| 1 | Displacement |
| 2 | Combination |
| 3 | Double decomposition |
| 4 | Substitution |
| 2 | |
| Rusting of iron is a combination reaction. Rust is the result of a reaction between iron and oxygen. | |

| Medium | |
| --- | --- |
| MCQ | |
| The formula for rust is | |
| 1 | CuO |
| 2 | Fe2O3.xH2O |
| 3 | AgNO3 |
| 4 | AgS |
| 2 | |
| Rust is hydrated ferric oxide (Fe2O3.xH2O) | |

| Medium | |
| --- | --- |
| MCQ | |
| Which of the following is/are obtained as a product of corrosion of certain metals? | |
| 1 | CuCO3.xCu(OH)2 |
| 2 | Fe2O3.xH2O |
| 3 | Ag2S |
| 4 | All of these |
| 4 | |
| Copper corrodes by giving copper carbonate and copper hydroxide, Iron rusts in presence of moisture to give iron oxide and silver corrodes in presence of atmospheric sulphur by giving silver sulphide. | |

| Easy | |
| --- | --- |
| MCQ | |
| Rancidity can be checked using | |
| 1 | Oxidants |
| 2 | Antioxidants |
| 3 | Not using nitrogen gas |
| 4 | By loose packing and keeping food in air |
| 2 | |
| Rancidity can be prevented by adding antioxidants, vacuum packing, replacing air with nitrogen, refrigeration of the food-stuff, or packaging of food items in airtight containers. | |

| Easy | |
| --- | --- |
| MCQ | |
| The methods of prevent corrosion can be | |
| 1 | Painting the surface of metal |
| 2 | Greasing the surface of metal |
| 3 | Varnishing or coating the surface of metal |
| 4 | All of the above |
| 4 | |
| The rusting of iron can be prevented by greasing, painting, galvanising, anodizing, or oiling the surface. | |

| Medium | |
| --- | --- |
| MCQ | |
| Generally packing of fat and oil containing food is done by adding N2 gas to it. It is because | |
| 1 | Nitrogen is too reactive |
| 2 | Nitrogen is unreactive gas and there is no oxygen of air to cause its oxidation |
| 3 | Nitrogen have very good taste |
| 4 | Nitrogen have very good odour |
| 2 | |
| Oil and fat containing food items are flushed with nitrogen because the non-reactive nitrogen gas does not combine with the oil and fat. It acts as an antioxidant and prevents them from being oxidised. | |

| Easy | |
| --- | --- |
| VSA | |
| Which substance is added to foods high in oil and fat to prevent rancidity? | |
| Refrigerating food, storing food away from light, storing food in airtight containers. | |

| Medium | |
| --- | --- |
| SA | |
| Why do we apply paint on iron articles? (NCERT) | |
| Iron articles are painted to prevent them from rusting. When left unpainted, the metal surface comes in contact with the atmospheric oxygen, and in the presence of moisture, it is from Iron(III) oxide. But if painted the surface does not come in contact with moisture and air thus preventing Rusting. | |

| Medium | |
| --- | --- |
| SA | |
| Oil and fat-containing food items are flushed with nitrogen. Why? | |
| The main purpose of flushing Nitrogen into food packets that contain oil and fat items is to prevent Rancidity which occurs when the oil or fat reacts with the oxygen letting out an unpleasant smell and taste. Therefore, by flushing Nitrogen, an unreactive surrounding is created thus preventing rancidity. | |

| Difficult | |
| --- | --- |
| LA | |
| (a) Explain the term “corrosion” with an example. Write a chemical equation to show the process of corrosion of iron.  (b) What special name is given to the corrosion of iron?  (c) State the various methods for preventing corrosion. | |
| a) When a metal is attacked by air or moisture that metal is said to have corroded and this whole process is termed as Corrosion.Corrosion is the process in which metals are eaten up gradually by the action of air,moisture or a chemical (such as an acid) on their surface.  **→**  Iron Oxygen Water Hydrated iron (III) oxide (Rust)  b) Corrosion of iron is called rusting. During the corrosion of iron (or rusting of iron), iron metal is oxidised by the oxygen of air in the presence of water (moisture) to form hydrated iron (III) oxide called rust.  (c). Steps to prevent rusting of iron:   * Painting the metal surfaces. * Powder coating the surfaces. * Coating the iron surface with oil or grease * Depositing a layer of zinc on the surface of iron. This process is called galvanisation. * Forming alloys of iron. | |

| Medium | |
| --- | --- |
| LA | |
| (a) Explain the term “rancidity”. What damage is caused by rancidity?  (b) What type of chemical reaction is responsible for causing rancidity?  (c) State the various methods for preventing or retarding rancidity of food. | |
| (a) The condition produced by aerial oxidation of fats and oils in foods marked by unpleasant smell and taste is called rancidity. It spoils the food materials prepared in fats and oils which have been kept for a considerable time and makes them unfit for eating.  (b) Oxidation is responsible for causing rancidity.  (c) Steps to prevent rancidity:   * Storing food materials in air-tight containers * Packaging food items in bags containing nitrogen * Refrigeration of food items * Addition of antioxidants or preservatives to the foods containing fats and oils. | |

| Medium | |
| --- | --- |
| LA | |
| (a) Explain the term “rancidity”. What damage is caused by rancidity?  (b) What type of chemical reaction is responsible for causing rancidity?  (c) State the various methods for preventing or retarding rancidity of food. | |
| (a) The condition produced by aerial oxidation of fats and oils in foods marked by unpleasant smell and taste is called rancidity. It spoils the food materials prepared in fats and oils which have been kept for a considerable time and makes them unfit for eating.  (b) Oxidation is responsible for causing rancidity.  (c) Steps to prevent rancidity:   * Storing food materials in air-tight containers * Packaging food items in bags containing nitrogen * Refrigeration of food items * Addition of antioxidants or preservatives to the foods containing fats and oils. | |

| Easy | |
| --- | --- |
| Assertion | |
| Assertion: Corrosion of iron is commonly known as rusting.  Reason: Corrosion of iron occurs in the presence of water and air. | |
| 1 | If both Assertion and Reason are correct and Reason is the correct explanation of Assertion |
| 2 | If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. |
| 3 | If Assertion is correct but Reason is incorrect. |
| 4 | If Assertion is incorrect but Reason is correct. |
| 5 | If both Assertion and Reason are incorrect |
| 2 | |
| Corrosion occurs due to oxidation of iron. | |

| Medium | |
| --- | --- |
| fill-blank | |
| Chemically rust is <answer> | |
| Hydrated Ferric oxide | |
|  | |

**Format**

Topic 1: Introduction to chemical reactions

| SA | |
| --- | --- |
| Which of the following is a scalar quantity 2? | |
| a | Velocity |
| b | Force |
| c | Acceleration |
| d | Distance |
| 3 | |
| Solution or explanation | |

| mcq | |
| --- | --- |
| Which of the following is a scalar quantity 3 ? | |
| a | Velocity |
| b | Force |
| c | Acceleration |
| d | Distance |
| jhj | |
| Solution or explanation | |

| mcq | |
| --- | --- |
| Which of the following is a scalar quantity 4? | |
| a | Velocity |
| b | Force |
| c | Acceleration |
| d | Distance |
| 4 | |
| Solution or explanation | |

| mcq | |
| --- | --- |
| Which of the following is a scalar quantity 5? | |
| a | Velocity |
| b | Force |
| c | Acceleration |
| d | Distance |
| 4 | |
| Solution or explanation | |

| multiple\_mcq | |
| --- | --- |
| Which of the following are types of electromagnetic waves? (Select all that apply) | |
| a | Radio waves |
| b | Sound waves |
| c | X-Rays |
| d | Gamma Rays |
| 1,3,4 | |
| Solution or explanation | |

| NUMBER | |
| --- | --- |
| A spring is compressed by 15 cm. If its spring constant is 200 N/m, what is the potential energy stored in the spring? | |
| 4.5 | |
| Potential Energy (PE) = 0.5 \* spring constant (k) \* displacement (x)^2  Given:  Spring constant (k) = 200 N/m  Displacement (x) = 0.15 m  Plugging in the values:  PE = 0.5 \* 200 N/m \* (0.15 m)^2  PE = 0.5 \* 200 N/m \* 0.0225 m^2  PE = 4.5 J  So potential energy stored in the spring when it is compressed by 15 cm is indeed 4.5 Joules | |

| ASSERTION | |
| --- | --- |
| Statement-1: The line xy = 0 x−2y+5a=0 touches the parabola xy =4a(x+1) where a is a positive constant. Statement - 2: The line tr = 0 m 2 (x+a)−my−a=0 touches the parabola dg y 2 =4a(x+a) for all non zero values of d . m. | |
| a | STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is a correct explanation for STATEMENT-1 |
| b | STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is NOT a correct explanation for STATEMENT-1 |
| c | STATEMENT-1 is True, STATEMENT-2 is False |
| d | STATEMENT-1 is False, STATEMENT-2 is True |
| 3 | |
| Solution or explanation | |

| TF | |
| --- | --- |
| Electrons are negatively charged subatomic particles located outside the atomic nucleus. | |
| true | |
| Explanation | |

| MATRIX | | | |
| --- | --- | --- | --- |
| Match the Following Scientists with Their Contributions | | | |
| 1:1,2:2,3:34,4:4 | | | |
| Solution or explanation | | | |

| fill-blank |
| --- |
| The SI unit of electric current is <answer> |
| Ampere |
| Explanation or solution |
|  |

| DESCRIPTIVE |
| --- |
| Explain the difference between speed and velocity. Provide examples to illustrate your answer. |
| answer |
| solution |

| number-range |
| --- |
| Explain the difference between speed and velocity. Provide examples to illustrate your answer. |
| 10,15 |
| solution |