

- (v) Which of the following statements is/are correct?
- (a) A chemical equation tells us about the substances involved in a reaction.
 - (b) A chemical equation informs us about the symbols and formulae of the substances involved in a reaction.
 - (c) A chemical equation tells us about the atoms or molecules of the reactants and products involved in a reaction.
 - (d) All the above.

2

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

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

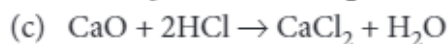
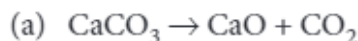
- (i) Which of the following reactions is a decomposition reaction?
- (a) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$
 - (b) $\text{NH}_4\text{CNO} \longrightarrow \text{H}_2\text{NCONH}_2$
 - (c) $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$
 - (d) $\text{H}_2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

3

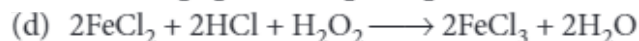
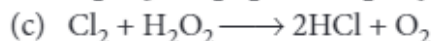
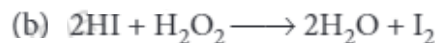
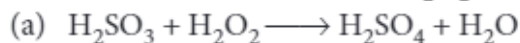
Read the following and answer any four questions from 3(i) to 3(v).

Redox reactions are those reactions in which oxidation and reduction occur simultaneously. A redox reaction is made up of two half reactions. In the first half reaction, oxidation takes place and in second half reaction, reduction occurs. Oxidation is a process in which a substance loses electrons and in reduction, a substance gains electrons. The substance which gains electrons is reduced and acts as an oxidising agent. On the other hand, a substance which loses electrons is oxidised and acts as a reducing agent.

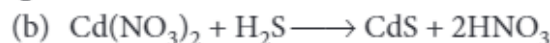
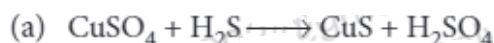
(i) Which of the following is a redox reaction?



(ii) Identify the reaction in which H_2O_2 is acting as a reducing agent.

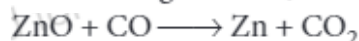


(iii) For the following reactions, identify the one in which H_2S acts as a reducing agent.



(d) None of these

(iv) For the following reaction, identify the correct statement.



(a) ZnO is being reduced.

(b) CO_2 is being oxidised.

(c) CO is being reduced.

(d) ZnO is being oxidised.

(v) In the following reaction, which substance is reduced?



(a) H_2O

(b) H_2O_2

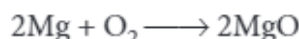
(c) PbS

(d) PbSO_4

4

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

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



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

(i) In a reaction, 35 g of reactant, PQ breaks down into 20 g of product, P and an unknown amount of product, Q . Using the law of conservation of mass, weight of products, Q will be

(a) 25 g

(b) 35 g

(c) 30 g

(d) 15 g

(ii) When solid mercury (II) oxide is heated, liquid mercury and oxygen gas are produced. Which of the following statements is true regarding the balanced chemical equation for this process?

(a) 1 mole of mercury (II) oxide produces two moles of mercury and one mole of oxygen gas.

(b) 2 moles of mercury (II) oxide produce one mole of mercury and one mole of oxygen gas.

(c) 1 mole of mercury (II) oxide produces half mole of mercury and half mole of oxygen gas.

(d) 2 moles of mercury (II) oxide produce 2 moles of mercury and one mole of oxygen gas.

(iii) Which of the following laws is satisfied by a balanced chemical equation?

(a) Law of multiple proportions

(b) Law of conservation of mass

(c) Law of conservation of motion

(d) Law of conservation of magnetism

(iv) In the given chemical reaction,



The values of m and n are respectively

(a) 14 and 8

(b) 12 and 6

(c) 8 and 10

(d) 12 and 10

(v) Sulphur dioxide reacts with oxygen to form sulphur trioxide. What would be the molar ratio of sulphur dioxide to sulphur trioxide?

(a) 2 : 3

(b) 1 : 1

(c) 1 : 2

(d) 3 : 2

5

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

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

(I) Evolution of heat

(II) Formation of precipitate

(III) Change in colour

(IV) Change in temperature

(V) Change in state

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

(i) Reaction of magnesium with air is a/an

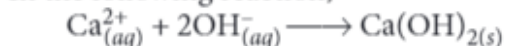
(a) exothermic reaction

(b) endothermic reaction

(c) reversible reaction

(d) substitution reaction.

(ii) In the following reaction,



precipitate of calcium hydroxide will be of

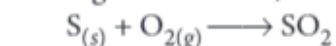
(a) green colour

(b) blue colour

(c) brown colour

(d) white colour.

(iii) In the given reaction,



the physical state of SO_2 is

(a) liquid

(b) solid

(c) gaseous

(d) all three.

(iv) Which one of the following processes involve chemical reactions?

(a) Storing of oxygen gas under pressure in a gas cylinder.

(b) Keeping petrol in a china dish in the open.

(c) Liquefaction of air.

(d) Heating copper wire in the presence of air at high temperature.

(v) In which of the following reactions, high amount of heat energy will be evolved?

(a) Electrolysis of water

(b) Dissolution of NH_4Cl in water

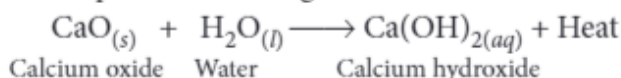
(c) Burning of L.P.G.

(d) Decomposition of AgBr in the presence of light

6

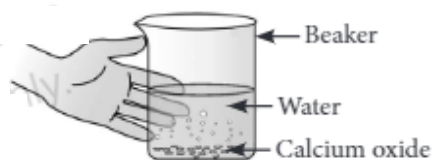
Read the following and answer any four questions from 6(i) to 6(v).

A reaction in which two or more reactants combine to form a single product is called a combination reaction. For example, calcium oxide reacts vigorously with water to form calcium hydroxide. The reaction is highly exothermic in nature, as lots of heat is produced during the reaction.



Solution of $\text{Ca}(\text{OH})_2$ is used for white wash the walls. Calcium hydroxide reacts slowly with carbon dioxide in air to form a thin layer of calcium carbonate on the wall which gives a shiny appearance to wall. Calcium carbonate will form after two or three days of white wash.

- (i) What is the chemical name of quick lime?
 (a) Calcium oxide (b) Calcium carbonate (c) Calcium hydroxide (d) Carbon dioxide
- (ii) When carbon dioxide is passed through lime water,
 (a) calcium hydroxide is formed (b) white precipitate of CaO is formed
 (c) lime water turns milky (d) colour of lime water becomes green.
- (iii) Following observations are observed when calcium oxide reacts vigorously with water.



Identify the incorrect observations.

- (I) It is an endothermic reaction. (II) Slaked lime is produced.
 (III) Quick lime is produced. (IV) It is an exothermic reaction.
 (V) It is a combination reaction.
- (a) (I) and (II) (b) (III) and (IV) (c) (I) and (III) (d) (II), (IV) and (V)
- (iv) Quick lime combines vigorously with water to form (A) which reacts slowly with the carbon dioxide in air to form (B).
 Identify the compounds (A) and (B).
- | (A) | (B) |
|-------------------------|---------------------|
| (a) Calcium carbonate | Calcium hydroxide |
| (b) Calcium hydroxide | Calcium carbonate |
| (c) Calcium | Calcium bicarbonate |
| (d) Calcium bicarbonate | Calcium |
- (v) Among the following, the endothermic reaction is
 (a) combination of carbon and oxygen to form carbon monoxide
 (b) combination of nitrogen and oxygen to form nitrogen monoxide
 (c) combination of glucose and oxygen to form carbon dioxide and water
 (d) combination of zinc and hydrochloric acid to form zinc chloride and hydrogen.

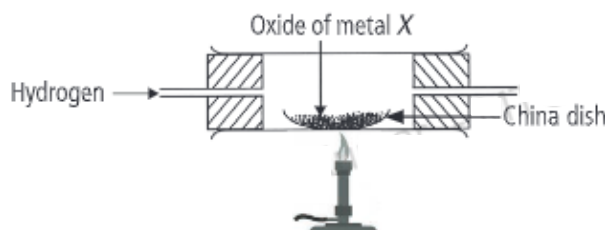
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Read the following and answer any four questions from 7(i) to 7(v).

Reactions in which one element takes place of another element in a compound, are known as displacement reactions. In general, more reactive elements displaces a less reactive element from its compound. In all single displacement reactions, only one element displaces another element from its compound. The single displacement reactions are, however, written as just displacement reactions. The displacement reaction between iron (III) oxide and powdered aluminium produces so much heat that iron metal obtained is in molten form.

- (i) Copper displaces which of the following metals from its salt solution?
 (a) ZnSO_4 (b) FeSO_4 (c) AgNO_3 (d) NiSO_4
- (ii) When zinc reacts with dilute sulphuric acid, the gas evolved is
 (a) red in colour and have a sweet smelling.
 (b) green in colour and have a foul smell.
 (c) colourless, odourless and burns with a pop sound.
 (d) colourless, pungent smelling and burns with a pop sound.

- (iii) When dry hydrogen is passed over a heated oxide of metal X using the apparatus shown below, a reddish-brown residue is obtained.



The reddish-brown residue could be

- (a) copper (b) lead (c) silver (d) zinc.
- (iv) Which of the following reactions is a displacement reaction?
- (a) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2$ (b) $\text{MgCO}_3 \longrightarrow \text{Mg} + \text{CO}_2$
 (c) $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgSO}_4 + \text{Cu}$ (d) $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$
- (v) When dilute hydrochloric acid is added to granulated zinc placed in a test tube, the observation made is
- (a) the surface of the metal turns shining
 (b) the reaction mixture turns milky
 (c) greenish yellow gas is evolved
 (d) the colourless and odourless gas evolves with a pop sound.

8

Read the following and answer any four questions from 8(i) to 8(v).

Those reactions in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions. A double displacement reaction usually occurs in solution and one of the products, being insoluble, precipitate out (separates as a solid). Any reaction in which an insoluble solid (called precipitate) is formed that separates from the solution is called a precipitation reaction. The reaction in which acid or acidic oxide reacts with base or basic oxide to form salt and water is called neutralisation reaction.

For example, $2\text{NaOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

- (i) When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of a
- (a) combination reaction (b) displacement reaction
 (c) decomposition reaction (d) double displacement reaction.
- (ii) Which of the following is not a double displacement reaction?
- (a) $\text{AgNO}_{3(aq)} + \text{NaCl}_{(aq)} \longrightarrow \text{AgCl}_{(s)} + \text{NaNO}_{3(aq)}$ (b) $\text{Zn}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \longrightarrow \text{ZnSO}_{4(aq)} + \text{H}_{2(g)}$
 (c) $\text{CuSO}_{4(aq)} + \text{H}_2\text{S}_{(aq)} \longrightarrow \text{CuS}_{(s)} + \text{H}_2\text{SO}_{4(aq)}$ (d) $\text{Pb(NO}_3)_2(aq) + 2\text{KI}_{(aq)} \longrightarrow \text{PbI}_{2(s)} + 2\text{KNO}_{3(aq)}$
- (iii) Barium chloride on reaction 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
- (a) (I) only (b) (II) only (c) (III) and (IV) only (d) (II) and (IV) only
- (iv) Identify A in the following reaction.
- $\text{AlCl}_{3(aq)} + 3\text{NH}_4\text{OH}_{(aq)} \longrightarrow \text{A} + 3\text{NH}_4\text{Cl}_{(aq)}$
- (a) Al(OH)_3 (b) Al_2O_3 (c) AlH_3 (d) AlN

(v) Consider the following reaction,



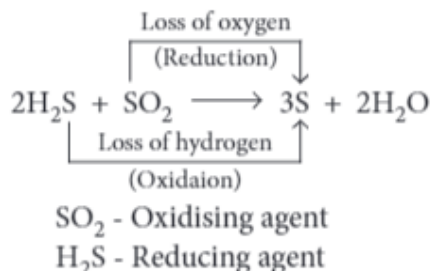
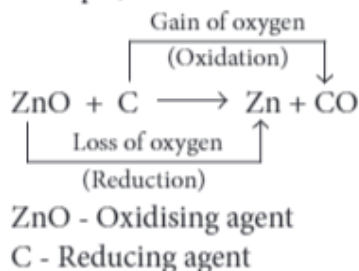
identify the precipitate in the reaction.

- (a) BaCl_2 (b) BaSO_4 (c) Na_2SO_4 (d) NaCl

9

Read the following and answer any four questions from 9(i) to 9(v).

The earlier concept of oxidation and reduction is based on the addition or removal of oxygen or hydrogen elements so, in terms of oxygen and hydrogen, oxidation is addition of oxygen to a substance and removal of hydrogen from a substance. On the other hand, reduction is addition of hydrogen to a substance and removal of oxygen from a substance. The substance which gives oxygen to another substance or removes hydrogen from another substance in an oxidation reaction is known as oxidising agent, while the substance which gives hydrogen to another substance or removes oxygen from another substance in a reduction reaction is known as reducing agent. For example,



(i) A redox reaction is one in which

- (a) both the substances are reduced
(b) both the substances are oxidised
(c) an acid is neutralised by the base
(d) one substance is oxidised while the other is reduced.

(ii) In the reaction, $\text{H}_2\text{S} + \text{Cl}_2 \longrightarrow \text{S} + 2\text{HCl}$

- (a) H_2S is the reducing agent. (b) HCl is the oxidising agent.
(c) H_2S is the oxidising agent. (d) Cl_2 is the reducing agent.

(iii) Which of the following processes does not involve either oxidation or reduction?

- (a) Formation of slaked lime from quick lime.
(b) Heating mercuric oxide.
(c) Formation of manganese chloride from manganese oxide (MnO_2).
(d) Formation of zinc from zinc blende.

(iv) $\text{Mg} + \text{CuO} \longrightarrow \text{MgO} + \text{Cu}$

Which of the following is wrong relating to the above reaction?

- (a) CuO gets reduced. (b) Mg gets oxidised. (c) CuO gets oxidised. (d) It is a redox reaction.

(v) Identify the correct oxidising agent and reducing agent in the following reaction.



- (a) Al - Oxidising agent, Fe_2O_3 - Reducing agent (b) Fe_2O_3 - Oxidising agent, Al - Reducing agent
(c) Fe - Oxidising agent, Al_2O_3 - Reducing agent (b) Fe_2O_3 - Oxidising agent, Al_2O_3 - Reducing agent

Read the following and answer any four questions from 10(i) to 10(v).

Oxidation has damaging effect on metals as well as on food. The damaging effect of oxidation on metal is studied as corrosion and that on food is studied as rancidity. The phenomenon due to which metals are slowly eaten away by the reaction of air, water and chemicals present in atmosphere, is called corrosion. For example, iron articles are shiny when new, but get coated with a reddish brown powder when left for sometime. This process is known as rusting of iron. Rancidity is the process of slow oxidation of oil and fat (which are volatile in nature) present in the food materials resulting in the change of smell and taste in them.

- (i) Rancidity can be prevented by
 (a) adding antioxidants (b) packaging oily food in nitrogen gas
 (c) both (a) and (b) (d) none of these.
- (ii) Combination of phosphorus and oxygen is an example of
 (a) oxidation (b) reduction (c) rancidity (d) none of these.
- (iii) A science teacher wrote the following statements about rancidity :
 (I) When fats and oils are reduced, they become rancid.
 (II) In chips packet, rancidity is prevented by oxygen.
 (III) Rancidity is prevented by adding antioxidants.
 Select the correct option.
 (a) (I) only (b) (II) and (III) only (c) (III) only (d) (I), (II) and (III)
- (iv) Two statements are given below regarding rusting of iron.
 (I) The rusting of iron is a redox reaction and reaction occurs as, $4\text{Fe} + 3\text{O}_2 \longrightarrow 4\text{Fe}^{3+} + 6\text{O}^{2-}$
 (II) The metallic iron is oxidised to Fe^{2+} and O_2 is reduced to O^{2-} .
 Select the correct statement(s).
 (a) I only (b) II only (c) Both I and II (d) None of these
- (v) Which of the following measures can be adopted to prevent or slow down rancidity?
 (I) Food materials should be packed in air tight container.
 (II) Food should be refrigerated.
 (III) Food materials and cooked food should be kept away from direct sunlight.
 (a) Only II and III (b) Only I and III (c) Only II and III (d) I, II and III

ASSERTION & REASON

For question numbers 11-30, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

- (a) Both A and R are true, and R is correct explanation of the assertion.
 (b) Both A and R are true, but R is not the correct explanation of the assertion.
 (c) A is true, but R is false.
 (d) A is false, but R is true.

11. **Assertion :** In the reaction, $\text{Zn}_{(s)} + 2\text{H}^+_{(aq)} \rightarrow \text{Zn}^{2+}_{(aq)} + \text{H}_{2(g)}$, zinc acts as an oxidising agent and H^+ acts as a reducing agent.

Reason : An oxidising agent accepts electrons while a reducing agent loses electrons.

12. **Assertion :** $2\text{H}_2\text{S}_{(g)} + \text{O}_{2(g)} \longrightarrow 2\text{S}_{(s)} + 2\text{H}_2\text{O}_{(l)}$
 It is a redox reaction.

Reason : In redox reaction, oxidation and reduction take place simultaneously.

13. **Assertion :** The reaction during which hydrogen is lost is called oxidation reaction.
Reason : Reducing agent removes hydrogen from another substance.
14. **Assertion :** $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$, is a redox reaction.
Reason : MnO_2 oxidises HCl to Cl_2 and gets reduced to MnCl_2 .
15. **Assertion :** Magnesium wire burns in presence of O_2 .
Reason : Magnesium acts as a reducing agent.
16. **Assertion :** Corrosion of iron is commonly known as rusting.
Reason : Corrosion of iron occurs in presence of moist air.
17. **Assertion :** Food materials are often packed in air tight container.
Reason : Oxidation, resulting in rancidity, is prevented.
18. **Assertion :** The food items containing oil and fat are flushed with nitrogen.
Reason : Oil and fat become rancid on oxidation which has the bad taste and smell.
19. **Assertion :** Following reaction describes the rusting of iron and is a redox reaction.
$$4\text{Fe} + 3\text{O}_2 \rightarrow 4\text{Fe}^{3+} + 6\text{O}^{2-}.$$

Reason : The metallic iron is oxidised to Fe^{3+} .
20. **Assertion :** Iron articles are painted so as to prevent them from rusting.
Reason : When the surface of iron is coated with paint, its surface does not come in contact with oxygen and moisture therefore rusting does not take place.
21. **Assertion :** Chemical reaction changes the physical and chemical state of a substance.
Reason : When electric current is passed through water (liquid), it decomposes to produce hydrogen and oxygen gases.
22. **Assertion :** In a balanced chemical equation, total mass of the reactants is equal to the total mass of the products.
Reason : Mass can neither be created nor destroyed during a chemical change.
23. **Assertion :** When calcium carbonate is heated, it decomposes to give calcium oxide and carbon dioxide.
Reason : The decomposition reaction takes place on application of heat, therefore, it is an endothermic reaction.
24. **Assertion :** Chips manufacturers usually flush bags of chips with gas such as nitrogen to prevent the chips from getting oxidised.
Reason : This increase the taste of the chips and helps in their digestion.
25. **Assertion :** Rusting of iron metal is the most common form of corrosion.
Reason : The effect of rusting of iron can be reversed if they are left open in sunlight.
26. **Assertion :** AgBr is used on photographic and X-ray film.
Reason : AgBr is photosensitive and changes to Ag and bromine in presence of sunlight and undergoes decomposition reaction.
27. **Assertion :** Magnesium ribbon keeps on burning in atmosphere of nitrogen.
Reason : Magnesium reacts with nitrogen to form magnesium nitride and this reaction is combination reaction.
28. **Assertion :** Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen gas and it is a displacement reaction.
Reason : Zinc reacts with oxygen to form zinc oxide.