1. Chemical Reations and Equations

Very Short Answer Type Questions-Pg-18

1. Question

Why is respiration considered an exothermic process?

Answer

Respiration is considered as an exothermic process as in this process glucose undergoes combustion by combining with oxygen in the cells of our body to give out energy thus respiration is an exothermic process

2. Question

On what basis is a chemical equation balanced?

Answer

A Chemical Equation is said to balanced if it is accordance with **Laws of Conservation of Mass** i.e there are equal number of atoms on both reactant as well as product side of the chemical equation

3. Question

What happens chemically when quicklime is added to water filled in a bucket?

Answer

Slaked lime is formed along with evolution of Heat when water is added to quicklime. The temperature of container will rise.

4. Question

Why should magnesium ribbon be cleaned before burning in air?

Answer

Magnesium ribbon must be cleaned before burning in the air so that the layer of magnesium oxide (which forms due to the reaction of magnesium with air) can be removed in order to get the desired chemical reaction.

5. Question

State whether the following statement is true or false:

A chemical equation can be balanced easily by altering the formula of a reactant or product.

Answer

False

A chemical reaction cannot be balanced by altering chemical formula of product.

6. Question

What is wrong with the following chemical equation?

$Mg + 0 \rightarrow MgO$

Correct and balance it.

Answer

Oxygen always exist in molecular form as O_2.

$2Mg + O_2 \rightarrow 2MgO$

7. Question

What does the symbol (aq) represent in a chemical equation?

Answer

It represents the compound is in aqueous solution form.

8. Question

Why is photosynthesis considered an endothermic reaction?

Answer

Sunlight is absorbed by the green plants during the process so it is an endothermic reaction.

9. Question

How will you indicate the following effects in a chemical equation?

(a) A solution made in water

(b) Exothermic reaction

(c) Endothermic reaction

Answer

(a) Solution made in water is denoted by aqueous symbol (aq).

(b) “+Heat” or “+Heat energy” or “+energy” on product side of chemical equation.

(c) “+Heat” or “+Heat energy” or “+energy” on reactants side of chemical equation.

10. Question

Translate the following statements into chemical equations and then balance the equations :

(a) Hydrogen sulphide gas bums in air to give water and sulphur dioxide.

(b) Phosphorus bums in oxygen to give phosphorus pentoxide.

(c) Carbon disulphide bums in air to give carbon dioxide and sulphur dioxide.

(d) Aluminium metal replaces iron from ferric oxide, Fe_20_3, giving aluminium oxide and iron.

(e) Bi:uiurn chloride reacts with zinc sulphate to give zinc chloride and barium sulphate.

Answer

(a) $2H_2S + 30_2 \rightarrow 2H_20 + 2S0_2$

(b) $P_4 + 50_2 \rightarrow 2P_20_5$

(c) $CS_2 + 30_2 \rightarrow C0_2 + 2S0_2$

(d) $2Al + Fe_20_3 \rightarrow Al_20_3 + 2Fe$

(e) $BaCl_2 + ZnS0_4 \rightarrow ZnCl_2 + BaS0_4$

11. Question

Write the balanced chemical equations for the following reactions:

(a) Calcium hydroxide + Carbon dioxide $\rightarrow$ Calcium carbonate + Water

(b) Aluminium + Copper chloride $\rightarrow$ Aluminium chloride + Copper

Answer

(a) $Ca(OH)_2 + CO_2 = CaCO_3 + H_2O$

Calcium hydroxide reacts with Carbon dioxide to give Calcium carbonate and water.

(b) $2Al + 3CuCl_2 \rightarrow 2AlCl_3 + 3Cu$

2 moles of aluminum reacts with 3 moles of Copper chloride to give 2 Aluminum chloride and 3 copper element.

12. Question

Complete and balance the following equations:

(a) $NaOH + ... \rightarrow Na_2S0_4 + H_20$

(b) $Ca(OH)_2 + ... \rightarrow CaC0_3 + H_20$

Answer

(a) $2NaOH + H_2SO_4 \rightarrow Na_2S0_4 + 2H_2O$

Sodium hydroxide reacts with **Sulphuric acid** to give Sodium sulphate and water.

(b) $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

Calcium hydroxide reacts with **carbon dioxide** to give Calcium carbonate and water.

13. Question

Correct and balance the following equations:

(i) $Ca + H_20 \rightarrow CaOH + H$

(ii) $N + H \rightarrow NH_3$

Answer

(i) $Ca + 2H_20 \rightarrow Ca(OH)_2 + H_2$

2 moles of Dihydrogen oxide(water) balances the reaction.

(ii) $N_2 + 3H_2 \rightarrow 2NH_3$

3 moles of hydrogen and 2 moles ammonia.

14. Question

Write complete balanced equations for the following reactions:

(a) Calcium (solid) +Water (liquid) $\rightarrow$ Calcium hydroxide (solution) +Hydrogen (gas)

(b) Sulphur dioxide (gas)+ Oxygen (gas) $\rightarrow$ Sulphur trioxide (gas)

Answer

(a) $Ca\ (s) + 2H_20\ (l) \rightarrow Ca(OH)_2\ (aq) + H_2\ (g)$

Calcium will react with 2 moles of water.

(b) $2S0_2\ (g) + 0_2\ (g) \rightarrow 2S0_3\ (g)$

2 moles of Sulphur dioxide and oxygen to give 2 moles of Sulphur trioxide.

15. Question

Balance the following equations:

(i) $Na + 0_2 \rightarrow Na_20$

(ii) $H_20_2 \rightarrow H_20 + 0_2$

(iii) $Mg(OH)_2 + HCl \rightarrow MgCl_2 + H_20$

(iv) $Fe + 0_2 \rightarrow Fe_20_3$

(v) $Al(OH)_3 \rightarrow Al_20_3 + H_20$

(vi) $NH_3 + CuO \rightarrow Cu + N_2 + H_20$

(vii) $Al_2(S0_4)_3 + NaOH \rightarrow Al(OH)_3 + Na_2S0_4$

(viii) $HN0_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$

(ix) $NaOH + H_2S0_4 \rightarrow Na_2SO_4 + H_2O$

(x) $BaCl_2 + H_2S0_4 \rightarrow BaSO_4 + HCl$

Answer

(i) $Na + 0_2 \rightarrow Na_20$

Step 1 - To balance chemical equations, first list the number of atoms of different type that are present in the chemical equation on both sides –

$Na + O_2 \rightarrow Na_2O$

Elements	Reactant	Product
Na	1	2
O	2	1

Step 2 - To start balancing, we take any one compound. We will take Na on the reactant side in consideration. Let's start with that.

Atoms of Na	In Reactant	In Product
Initial	1x4=4	2x2=4
Balanced	2	1x2

This makes the partially Balanced Equation as:-

$4Na + O_2 \quad 2Na_2O$

Step 3 - Now checking for all other elements we note that the numbers of atoms on both sides are same. We can say that the equation is balanced.

(ii) $2H_20_2 \rightarrow 2H_20 + 0_2$

Step 1 - To balance chemical equations, first list the number of atoms of different type that are present in the chemical equation on both sides –

$2H_20_2 \rightarrow H_2O + O_2$

Elements	Reactant	Product
Na	1	2
O	2	1

Step 2 - To start balancing, we take any one compound. We will take Na on the reactant side in consideration. Let's start with that.

Atoms of Na	In Reactant	In Product
Initial	1x4=4	2x2=4
Balanced	2	1x2

This makes the partially Balanced Equation as:-

(iii) $Mg(OH) + 2HCl \rightarrow MgCl_2 + 2H_20$.

2 moles of HCl and 2 moles of hydrogen peroxide will balance the equation.

(iv) $4Fe + 30_2 \rightarrow 2Fe_20_3$

Adding 4 moles of Fe and balancing the equation with Fe will complete the equation.

(v) $2Al(0H)_3 \rightarrow Al_20_3 + 3H_20$

2 moles of aluminum hydroxide and 3 moles of water will balance the equation.

(vi) $2NH_3 + 3Cu0 \rightarrow 3Cu + N_2 + 3H_20$

Adding 2 moles of ammonia and balancing the equation accordingly.

(vii) $Al2(S0)_2 + 6NaOH \rightarrow 2Al(0H) + 3Na2S04$

6 moles of NaoH and balancing the oxygen and sodium will complete the equation.

(viii) $2HN0_3 + Ca(OH)_2 \rightarrow Ca(N03)_2 + 2H_20$

2 moles Nitric acid and 2 moles of water will balance the equation.

(ix) $2NaOH + B_2S04 \rightarrow Na_2S0_4 + 2H_20$

2 moles of sodium hydroxide and 2 moles of water will balance the reaction.

(x) $BaCl_2 + H_2S0_4 \rightarrow BaS0_4 + 2HCl$

2 moles of HCl will balance the reaction.

16. Question

Fill in the following blanks with suitable words:

(a) Chemical equations are balanced to satisfy the law of .....

(b) A solution made in water is known as an ..... solution and indicated by the symbol .....

Answer

Chemical equation are balanced to Satisfy the law of conservation of mass.

(b) A solution made in water is known as an aqueous solution and indicated by the symbol (aq.).

Short Answer Type Questions-Pg-19

17 A. Question

Give one example of a chemical reaction.

Answer

Magnesium Oxide (white color powder) is formed when Magnesium ribbon is burned in air rich atmosphere.

17 B. Question

State two characteristics of the chemical reaction which takes place when dilute sulphuric acid is poured over zinc granules.

Answer

(b) if dil.H_2SO_4 is poured over Zinc granules:

(i) Rise in temperature.

(ii) Hydrogen gas is released.

17 C. Question

Give two characteristics of the chemical reaction which occurs on adding potassium iodide solution to lead nitrate solution.

Answer

(i) Formation of yellow precipitate.

(ii) The reaction color is changed from colorless to yellow.Reaction Taking place is as follow:-$KI(aq) + Pb(NO_3)_2(aq) \rightarrow KNO_3(aq) + PbI_2(s)$

18 A. Question

What is a chemical equation? Explain with the help of an example.

Answer

Chemical reaction, a process in which one or more substances, (reactants), converts to one or more different substances (products). For example – Magnesium reacting with oxygen to form Magnesium (III) oxide.Magnesium + Oxygen → Magnesium Oxide**Mg** + O_2 ----> 2**MgO**.

18 B. Question

Giving examples, state the difference between balanced and unbalanced chemical equations.

Answer

In a balanced reaction no of moles of any element is equal on both side of a chemical equation where as in an unbalanced reaction no moles are not equal.

Balanced reaction:

$2Mg + 0_2 \rightarrow 2Mg0$

Unbalanced Reaction:

$C + C0_2 \rightarrow CO$

18 C. Question

Balance the following chemical equations:

(i) $NH_3 \rightarrow N_2 + H_2$

(ii) $C + C0_2 \rightarrow CO$

Answer

(i) $2NH_3 \rightarrow N_2 + 3H_2$

2 moles of ammonia on the reactant side and 3 moles of hydrogen on the product side will balance the reaction.

(ii) $C + C0_2 \rightarrow 2CO$

Adding 2 moles of carbon on the product side will balance the reaction.

19. Question

When hydrogen is passed over copper oxide, copper and steam are formed. Write a balanced equation for this reaction and state which of the chemicals are:

(i) elements

(ii) compounds

(iii) reactants

(iv) products

(v) metals

(vi) non-metals

Answer

The balanced chemical reaction:

$H_2 + CuO \rightarrow Cu + H_20$

(i) H_2 and Cu are elements in the reaction.

(ii) The compounds are CuO and H_20

(iii) The reactants are H_2 and CuO

(iv) The Products are Cu and H_20

(v) Metal involved in reaction Cu

(vi) The Non-metal involved in reaction H_2.

20 A. Question

What are the various ways in which a chemical equation can be made more informative? Give examples to illustrate your answer.

Answer

Ways in which a chemical reaction can be informative:

(i) Indicating the physical state of reactants and products. Example: (g) denotes the gaseous state.

$Zn\ (s) + H_2SO_4\ (aq.) \rightarrow ZnSO_4\ (aq.) + H_2\ (g)$

(ii) Indicating Heat change. For example: writing "+Heat" or "+Heat energy" or "+Energy" on the products side of an equation denotes exothermic reaction.

$C(s) + O_2\ (g) \rightarrow CO_2\ (g) + Heat$

(iii) Indication of the "conditions" under/in which the reaction takes place.

Example: Heat is denoted by delta which is written over the arrow in an equation.

$$2KClO_3\ (s) \xrightarrow[MnO_2]{\Delta} 2KCl\ (s) + 3O_2\ (g)$$

20 B. Question

(b) Write 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.

Answer

$Ca(OH)_2\ (aq) + C0_2\ (g) \rightarrow CaC0_3\ (s) + H_20\ (l)$

This reaction is balanced as same amount of elements and compound is on either side.

21 A. Question

What is a balanced chemical equation? Why should chemical equations be balanced?

Answer

Equal number of atom of different element are present in a balanced chemical equation. A chemical is balanced to obey the law of conservation of chemical reaction meaning equal masses of various elements in reactants and products.

21 B. Question

Aluminium burns in chlorine to form aluminium chloride ($AlCl_3$). Write a balanced chemical equation for this reaction.

Answer

$2Al + 3Cl_2 \rightarrow 2AlCl_3$

Equation is balanced.

21 C. Question

Potassium metal reacts with water to give potassium hydroxide and hydrogen gas. Write a ba lanced chemical equation for this reaction.

Answer

$2K + 2H_20 \rightarrow 2KOH + H_2$

22 A. Question

Explain, with example, how the physical states of the reactants and products can be shown in a chemical equation.

Answer

Physical State of reactants and products can be shown by putting the “State Symbols” in an equation.

For example:

$Zn\ (s) + H_2SO_4\ (aq.) \rightarrow ZnSO4\ (aq..) + H_2\ (g)$

22 B. Question

Balance the following equation and add state symbols:

$Zn + HCl \rightarrow ZnCl_2 + H_2$

Answer

$Zn\ (s) + 2HCl\ (aq.) \rightarrow ZnCl_2\ (aq.) + H_2\ (g)$

The equation is balanced.

22 C. Question

Convey the following information in the form of a balanced chemical equation:

"An aqueous solution of ferrous sulphate reacts with an aqueous solution of sodium hydroxide to form a precipitate of ferrous hydroxide and sodium sulphate remains in solution."

Answer

$FeS0_4(aq.) + 2NaOH(aq.) \rightarrow Fe(OH)_2\ (s) + Na\ 2S0_2\ (aq.)$

The equation is balanced.

23. Question

Write any two observations in an activity which may suggest that a chemical reaction has taken place. Give an example in support of your answer.

Answer

(i) Formation of gaseous compound or element and effervescence of the same.

Example:

$Zn\ (s) + 2HCl\ (aq.) \rightarrow ZnCl_2\ (aq.) + H_2\ (g)$

Here Hydrogen gas is released.

(ii) Precipitate formation.

Example: Adding potassium iodide in a solution of lead nitrate, the yellow color precipitate(lead-iodide) is formed.

24 A. Question

Aluminium hydroxide reacts with sulphuric acid to form aluminium sulphate and water. Write a balanced equation for this reaction.

Answer

$2Al(0H)_2 + 3H_2S0_4 \rightarrow Al2(S0_4)_2 + 6H_20$

The reaction is balanced.

24 B. Question

Balance the following chemical equation :

$Mn0_2 + HCl \rightarrow MnCl_2 + Cl_2 + H_20$

Answer

Step 1 - To balance chemical equations, first list the number of atoms of different type that are present in the chemical equation on both sides –$MnO_2 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$

Elements	On Reactant Side	On Product Side
Mn	1	1
O	1 x 2=2	1
H	1	2
Cl	1	4

Step 2 - To start balancing, we take any one compound. We will take HCl on the reactant side in consideration. Let's start with that.

Elements	On Reactant Side	On Product Side
Mn	1	1
O	2	2 x 1=2
H	1 x 4=4	2 x 2=4
Cl	1 x 4=4	4

Hence the Partially Balanced Equation will be:- $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_20$

Step 3 - Now checking for all other elements we note that the numbers of atoms on both sides are same. We can say that the equation is balanced.

25. Question

Write the balanced equations for the following reactions, and add the state symbols :

(a) Magnesium carbonate reacts with hydrochloric acid to produce magnesium chloride, carbon dioxide and water.

(b) Sodium hydroxide reacts with sulphuric acid to produce sodium sulphate and water.

Answer

(a) $MgC0_3$ (s) + 2HCl (aq.) $\rightarrow$ $MgCl_2$ (aq.) + $C0_2$ (g) + H_20 (l)

Equation is balanced.

(b) 2NaOH (aq.) + H_2S0_4 (aq.) $\rightarrow$ Na $2S0_4$ (aq.) + $2H_20$ (l)

Equation is balanced.

26. Question

Carbon monoxide reacts with hydrogen under certain conditions to form methanol (CH30H). Write a balanced chemical equation for this reaction indicating the physical states of reactants and product as well as the conditions under which this reaction takes place.

Answer

$$CO(g) + 2H_2 \xrightarrow{300\,atm,300C} CH_3OH(I)$$

Here carbon monoxide reacts with hydrogen to give Methanol, with catalyst as **$ZnO+CrO_3$**and Pressure of 300 atm. And temperature of 300^oC.

27 A. Question

Potassium chlorate (KC103) on heating forms potassium chloride and oxygen. Write a balanced equation for this reaction and indicate the evolution of gas.

Answer

$2KClO_3\ (s) \rightarrow 2KCl\ (s) + 3O_2\ (g)$

Here oxygen will be released in the form of O_2 gas.

27 B. Question

(b) Rewrite the following information in the form of a balanced chemical equation : Magnesium burns in carbon dioxide to form magnesium oxide and carbon.

Answer

$2Mg + C0_2 \rightarrow 2Mg0 + C$

Magnesium reacts with Carbon dioxide to form MgO.

28 A. Question

Substitute formulae for names and balance the following equation :

Calcium carbonate reacts with hydrochloric acid to produce calcium chloride, water and carbon dioxide gas.

Answer

(a) $CaC0_3 + 2HCl \rightarrow CaCl_2 + H_20 + C0_2$

The equation is balanced and states of equation are denoted.

28 B. Question

(b) Write balanced chemical equation with state symbols for the following reaction:

Sodium hydroxide solution reacts with hydrochloric acid solution to produce sodium chloride solution and water.

Answer

$NaOH\ (aq.) + HCl\ (aq.) \rightarrow NaCl\ (aq.) + H_20\ (l)$

The equation is balanced and states of compounds are denoted.

29. Question

Ammonia reacts with oxygen to form nitrogen and water. Write a balanced chemical equation for this reaction.

Add the state symbols for all the reactants and products.

Answer

$4NH_3\ (g) + 30_2(g) \rightarrow 2N_2\ (g) + 6H_20\ (l)$

The equation is balanced and states of reactants and products are denoted.

30. Question

Write a balanced chemical equation for the process of photosynthesis giving the physical states of all the substances involved and the conditions of the reaction.

Answer

$6CO_2\ (g) + 6H_2O\ (l) \rightarrow C_6H_{12}O_6\ (aq.) + 6O_2\ (g)$

Carbon dioxide reacts with water to form glucose and oxygen in elemental gas form.

31. Question

Translate the following statement into chemical equation and then balance it :

Barium chloride solution reacts with aluminium sulphate solution to form a precipitate of barium sulphate and aluminium chloride solution.

Answer

$3BaCl_2\ (aq) + Al_2(S0_4)_2\ (aq.) \rightarrow 3BaS0_4\ (s) + 2AlCl_3\ (aq.)$

Barium chloride reacts with aluminum sulphate to form barium sulphate and aluminum chloride.

32. Question

When potassium nitrate is heated, it decomposes into potassium nitrite and oxygen. Write a balanced equation for this reaction and add the state symbols of the reactants and products.

Answer

$2KN0_3\ (s) \rightarrow 2KN0_2\ (s) + 0_2\ (g)$

The equation is balanced and state symbols are denoted with the compounds.

Long Answer Type Questions-Pg-20

33 A. Question

What is meant by a chemical reaction? Explain with the help of an example.

Answer

Chemical reaction are defined as processes in which new substance are formed with new properties.

For example: When carbon is burned in rich oxygen environment carbon dioxide and ash is formed.

33 B. Question

Give one example each of a chemical reaction characterised by:

(i) evolution of a gas

(ii) change in colour

(iii) formation of a precipitate

(iv) change in temperature

(v) change in state.

Answer

(i) Reaction between zinc metal and sulphuric acid.

(ii) Reaction between citric acid and purple colored potassium permanganate. (from purple to colorless).

(iii) Reaction between Potassium iodide and lead nitrate is characterized by the formation of a yellow precipitate of lead iodide.

(iv) The reaction between quick lime and water to form slaked lime is characterized by a change in temperature.

(v) Water and carbon dioxide are formed when wax is burned. Wax is solid whereas products are liquid and gas.

34 A. Question

State the various characteristics of chemical reactions.

Answer

(a) The various characteristics of chemical reaction are as follows:

(i) Effervescence of gas.

(ii) Precipitate formation.

(iii) Colour Change.

34 B. Question

State one characteristic each of the chemical reaction which takes place when:

(i) dilute hydrochloric acid is added to sodium carbonate

(ii) lemon juice is added gradually to potassium permanganate solution

(iii) dilute sulphuric acid is added to barium chloride solution

(iv) quicklime is treated with water

(v) wax is burned in the form of a candle

Answer

(i) Carbon dioxide formation.

(ii) Colour change from purple to clourless.

(iii) Barium sulphate a white precipitate is formed.

(iv) Temperature change.

(v) State change from solid to liquid and gas.

35 A. Question

What do you understand by exothermic and endothermic reactions?

Answer

Heat evolving reaction are known as exothermic reactions. In these reactions Heat is released when reaction starts. The energy needed to initiate the reaction is less than the energy needed given from the reaction.

In reaction where heat is absorbed are known as endothermic. The heat energy is gained from the atmosphere in this reaction. The heat required to initiate the reaction is fairly high than the heat given from the reaction.

35 B. Question

Give one example of an exothermic reaction and one of an endothermic reaction.

Answer

Example of Exothermic Reaction:

$C\ (s) + O_2\ (g)\ CO_2 + Heat$

Example of endothermic reaction:

$N_2\ (g) + O_2\ (g) + Heat\ 2NO\ (g)$

35 C. Question

Which of the following are endothermic reactions and which are exothermic reactions ?

(i) Burning of natural gas

(ii) Photosynthesis

(iii) Electrolysis of water

(iv) Respiration

(v) Decomposition of calcium carbonate

Answer

Reaction which are endothermic: Photosynthesis, Electrolysis of water, Decomposition of calcium carbonate;

Exothermic reaction: Burning of natural gas, Respiration.

Multiple Choice Questions (MCQs)-Pg-21

36. Question

One of the following does not happen during a chemical reaction. This is: A. Breaking of old chemical bonds and formation of new chemical bonds

B. Formation of new substances with entirely different properties

C. Atoms of one element change into those of another element to form new products.

D. A rearrangement of atoms takes place to form new products.

Answer

Atoms do not change during chemical reaction.

37. Question

Which of the following does not involve a chemical reaction? A. digestion of food in our body

B. process of respiration

C. burning of candle wax when heated

D. melting of candle wax on heating

Answer

Candle wax melting is not a chemical reaction.

38. Question

You are given the solution of lead nitrate. In order to obtain a yellow precipitate you should mix with it a solution of: A. potassium chloride

B. potassium nitride

C. potassium sulphide

D. potassium iodide

Answer

potassium iodide reacts with lead nitrate to give a yellow precipitate of lead iodide.

39. Question

An acid which can decolourise purple coloured potassium permanganate solution is:
A. sulphuric acid

B. citric acid

C. carbonic acid

D. hydrochloric acid

Answer

Citric acid makes the solution colorless.

40. Question

The chemical reaction between two substances is characterised by a change in colour from orange to green.

These two substances are most likely to be:

A. potassium dichromate solution and sulphur dioxide

B. potassium permanganate solution and sulphur dioxide

C. potassium permanganate solution and lemon juice

D. potassium dichromate solution and carbon dioxide.

Answer

Potassium dichromate solution and Sulphur dioxide on reaction changes colour from orange to green.

41. Question

The chemical reaction between quicklime and water is characterised by: A. evolution of hydrogen gas

B. formation of slaked lime precipitate

C. change in temperature of mixture

D. change in colour of the product

Answer

quicklime reacts with water in an exothermic reaction

42. Question

One of the following is an endothermic reaction. This 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

Answer

Nitrogen and oxygen reacts in an endothermic reaction.

43. Question

Which of the following is not an endothermic reaction? A. $CaC0_3 \rightarrow CaO + C0_2$

B. $2H_20 \rightarrow 2H_2 + 0_2$

C. $6C0_2 + 6H_20 \rightarrow C_6H_{12}0_6 + 60_2$

D. $C_6H_{12}0_6 + 60_2 \rightarrow 6C0_2 + 6H_20$

Answer

Glucose reacts with oxygen to give carbon dioxide and water.

44. Question

One of the following is an exothermic reaction. This is: A. electrolysis of water

B. conversion of limestone into quicklime

C. process of respiration

D. process of photosynthesis

Answer

Respiration is exothermic reaction in which oxygen is consumed and heat is produced.

45. Question

The chemical equations are balanced to satisfy one of the following laws in chemical reactions. This law is known as: A. law of conservation of momentum

B. law of conservation of mass

C. law of conservation of motion

D. law of conservation of magnetism

Answer

In a chemical reaction law of conservation of mass is followed.

Questions Based on High Order Thinking Skills (HOTS)-Pg-22

46. Question

When the solution of substance X is added to a solution of potassium iodide, then a yellow solid separates out from the solution.

(a) What do you think substance X is likely to be?

(b) Name the substance which the yellow solid consists of.

(c) Which characteristic of chemical reactions is illustrated by this example ?

(d) Write a balanced chemical equation for the reaction which takes place. Mention the physical states of all the reactants and products involved in the chemical equation.

Answer

(a) Lead nitrate is X as it reacts with potassium iodide to give yellow precipitate.

(b) Lead iodide is the yellow precipitate.

(c) Precipitate formation is shown by this reaction.

(d) Pb(N03) (aq.) + 2KI (aq.)

Pbl2 (s) + 2KN03 (aq.)

47. Question

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 white washing. 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 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?

Answer

(a) Solid X is Calcium oxide(CaO)

(b) Product Y is Calcium hydroxide($Ca(OH)_2$)

(c) Common name of Y is Lime Water.

(d) $CaO + H_2O \rightarrow Ca(OH)_2$

(e) Temperature Change is shown by this reaction.

48. Question

When metal X is treated with a dilute acid Y, then a gas Z is evolved which bums readily by making a little explosion.

(a) Name any two metals which can behave like metal X.

(b) Name any two acids which can behave like acid Y.

(c) Name the gas Z.

(d) Is the gas Z lighter than or heavier than air?

(e) Is the reaction between metal X and dilute acid Y exothermic or endothermic?

(f) By taking a specific example of metal X and dilute acid Y, write a balanced chemical equation for the reaction which takes place. Also indicate physical states of all the reactants and products.

Answer

(a) Zinc and Iron behaves like metal X.

(b) HCL and H_2SO_4 behaves like Y.

(c) The gas is Hydrogen.

(d) Gas Z is lighter than air.

(e) The reaction is Exothermic.

(f) Take X as Zinc(Zn) and acid Y as Dil. Hydrochloric acid(HCl).

$Zn\ (s) + 2HCl\ (aq.) \rightarrow ZnCl_2\ (aq.) + H_2\ (g)$

49. Question

A solid substance P which is very hard is used in the construction of many buildings, especially flooring. When substance P is heated strongly, it decomposes to form another solid Q and a gas R is given out. Solid Q reacts with water with the release of a lot of heat to form a substance S. When gas R is passed into a clear solution of substance S, then a white precipitate of substance T is formed. The substance T has the same chemical composition as starting substance P.

(a) What is substance P? Write its common name as well as chemical formula.

(b) What is substance Q?

(c) What is gas R?

(d) What is substances? What is its clear solution known as?

(e) What is substance T? Name any two natural forms in which substance T occurs in nature.

Answer

(a) Substance P is Calcium Carbonate (Limestone), $CaCO_3$.

(b) Substance Q is Calcium oxide, CaO

(c) Gas R is carbon dioxide.

(d) Substance S is Calcium hydroxide, $Ca(OH)_2$; Lime water

(e) Substance T is Calcium carbonate; Limestone and Marble.

50. Question

A silvery-white metal X taken in the form of ribbon, when ignited, burns in 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 substances.

(a) What could metal X be?

(b) What is powder Y?

(c) With which substance metal X combines 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.

Answer

(a) Metal X is Magnesium, Mg.

(b) Powder Y is Magnesium oxide, MgO.

(c) Metal X combines with Oxygen to form powder Y

(d) Substance Z is Magnesium hydroxide, $Mg(OH)_2$; Used as antacid to relieve indigestion.

(e) $2Mg + O_2 \rightarrow 2MgO$

51. Question

A metal X forms a salt $XS0_4$. The salt $XS0_4$ forms a clear solution in water which reacts with sodium hydroxide solution to form a blue precipitate Y. Metal X is used in making electric wires and alloys like brass.

(a) What do you think metal X could be?

(b) Write the name, formula and colour of salt X $S0_4$

(c) What is the blue precipitate Y?

(d) Write a chemical equation of the reaction which takes place when salt $XS0_4$ reacts with sodium hydroxide solution. Give the state symbols of all the reactants and products which occur in the above equation.

Answer

(a) Metal X is copper, Cu.

(b) Formula for salt XSO_4 is $CuSO_4$

And colour is "Blue".

(c) Blue precipitate is Copper Hydroxide, $Cu(OH)_2$

(d) $CuS0_4$ (aq.) +2NaOH (aq.) $\rightarrow$ $Cu(OH)_2$ (s) + Na $2S0_4$ (aq.)

Above is the chemical equation of the reaction.

52. Question

The metal M reacts vigorously with water to form a solution S and a gas G. The solution S turns red litmus to blue whereas gas G, which is lighter than air, burns with a pop sound. Metal M has a low melting point and it is used as a coolant in nuclear reactors.

(a) What is metal M?

(b) What is solution S? Is it acidic or alkaline?

(c) What is gas G?

(d) Write a balanced chemical equation for the reaction which takes place when metal M reacts with water.

(e) Is this reaction exothermic or endothermic?

Answer

(a) Metal, M is Sodium (Na).

(b) Solution S is Sodium hydroxide solution (NaOH solution). It is Alkaline.

(c) Gas G is Hydrogen (H_2).

(d) $2Na + 2H_2O \rightarrow 2NaOH + H_2$

(e) The reaction is Exothermic.

53. Question

When a mixture of gases X and Y is compressed to 300 atm. pressure and then passed over a catalyst consisting of a mixture of zinc oxide and chromium oxide (heated to a temperature of 300 °C), then an organic compound Z having the molecular formula CH40 is formed. X is a highly poisonous gas which is formed in appreciable amounts when a fuel burns in a limited supply of air; Y is a gas which can be made by the action of a dilute acid on an active metal; and Z is a liquid organic compound which can react with sodium metal to produce hydrogen gas.

(a) What are X, Y and Z?

(b) Write a balanced chemical equation of the reaction which takes place when X and Y combine to form Z. Indicate the conditions under which the reaction occurs.

Answer

(a) X is Carbon monoxide gas(CO).

Y is Hydrogen Gas(H_2).

Z is Methanol(CH_3OH).

(b) Formation of Z:-

$$CO(g) + 2H_2(g) \xrightarrow{300\ atm,\ 300C} CH_3OH(I)$$

Conditions required for the reaction to take place:

(i) A pressure of 300 atmosphere

(ii) And a catalyst which is mixture of Zinc oxide and Chromium Oxide. (ZnO + CrO_3).

54. Question

The white solid compound A decomposes quite rapidly on heating in the presence of a black substance X to form a solid compound B and a gas C. When an aqueous solution of compound B is reacted with silver nitrate solution, then a white precipitate of silver chloride is obtained along with potassium nitrate solution. Gas C does not burn itself but helps burn other things.

(a) What is compound A?

(b) What is compound B?

(c) What is gas C?

(d) What do you think is the black substance X? What is its function?

(e) What is the general name of substances like X?

Answer

(a) The compound A is Potassium chlorate, $KClO_3$.

(b) The compound B is Potassium chloride, KCl.

(c) Gas C is Oxygen, O_2.

(d) The black substance is Manganese dioxide, MnO_2. It is a catalyst Used in decomposition of potassium Chlorate to form Oxygen gas.

(e) General name for substances like X is catalysts.

55. Question

Gas A, which is the major cause of global warming, combines with hydrogen oxide B in nature in the presence of an environmental factor C and a green material D to form a six carbon organic compound E and a gas F. The gas F is necessary for breathing.

(a) What is gas A?

(b) What is the common name of B?

(c) What do you think could be C?

(d) What is material D? Where is it found?

(e) Name the organic compound E.

(f) What is gas F? Name the natural process during which it is released?

Answer

(a) Gas A is Carbon Dioxide, CO_2.

(b) Common name for B is Water, H_2O.

(c) Environmental factor C is sunlight.

(d) Material D is Chlorophyll; found in Green leaves of plants.

(e) Compound E is Glucose, $C_6H_{12}O_6$.

(f) Gas F is Oxygen; Process is Photosynthesis.

Very Short Answer Type Questions-Pg-45

1. Question

What type of reaction is represented by the digestion of food in our body?

Answer

Decomposition Reaction is represented by digestion of food in our body.

2. Question

Name the various types of chemical reactions.

Answer

(i) Combination Reaction.

(ii) Decomposition reaction.

(iii) Displacement Reaction.

(iv) Double Displacement Reaction.

(v) Oxidation and reduction Reaction.

3. Question

Why does the colour of copper sulphate solution change when an iron nail is kept immersed in it ?

Answer

Colour of Copper Sulphate Solution changes due to displacement reaction taking place between iron and copper which forms iron suplhate when iron nail is kept immersed in it.

4. Question

Write the balanced chemical equation for the following reaction :

Zinc + Silver nitrate $\rightarrow$ Zinc nitrate + Silver

Answer

$$Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$$

The reaction is balanced.

5. Question

Which 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)?

Answer

“Rancidity” is used to indicate the development of foul smell and taste.

6. Question

What is the general name of the chemicals which are added to fat and oil containing foods to prevent the development of rancidity?

Answer

Anti-oxidant is the general name for those compounds.

7. Question

State an important use of decomposition reactions.

Answer

Digestion of food in our body is an example of decomposition reaction.

8. Question

What are anti-oxidants? Why are they added to fat and oil containing foods?

Answer

Oxidation preventing Substances are called Anti-oxidants. They are added to fats and oils to prevent rancidity.

9. Question

Explain why, food products containing fats and oils (like potato chips) are packaged in nitrogen.

Answer

To prevent oxidation due to presence of oxygen and make it rancid.

10. Question

Give one example of a decomposition reaction which is carried out:

(a) with electricity

(b) by applying heat

Answer

(a) To obtain sodium metal fused sodium chloride is decomposed by passing electricity and sodium metal is obtain.

(b) Strongly heating lead nitrate, breaks down it into form lead monoxide, nitrogen dioxide and oxygen.

11. Question

What type of chemical reaction is used to extract metals from their naturally occurring compounds like oxides or chlorides?

Answer

(a) Decomposition reaction (using electricity) are used to extract metals.

12. Question

Name two anti-oxidants which are usually added to fat and oil containing foods to prevent rancidity.

Answer

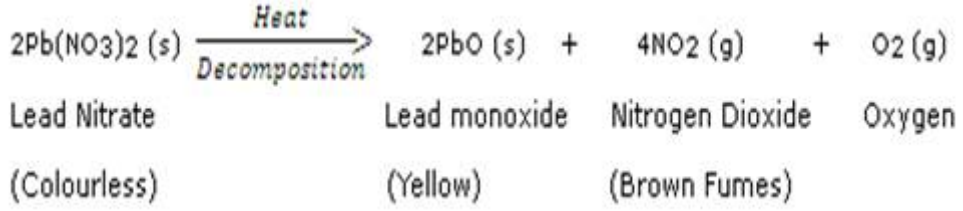
BHA (Butylated Hydroxy Anisole) and BHT (Butylated Hydroxy Toluene) are usually added as anti-oxidants.

13. Question

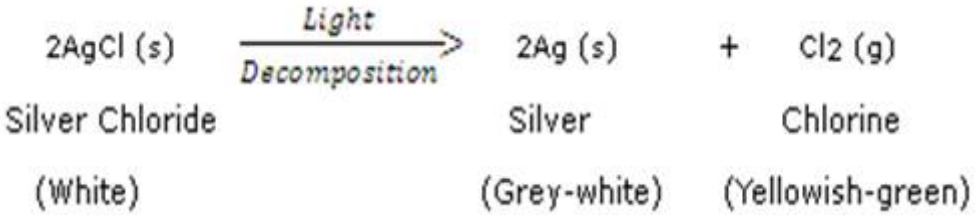
Write one equation each for the decomposition reactions where energy is supplied in the form of (a) heat, (b) light, and(c) electricity.

Answer

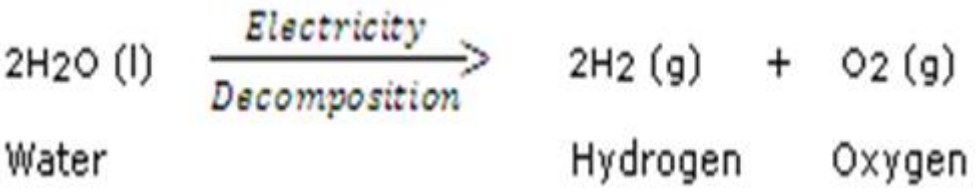
(a) Decomposition reaction, heat is used as energy.



(b) Light is supplied as energy



(c) Electricity is Supplied as energy



14. Question

In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the chemical equation of the reaction

involved.

Answer

The chemical reaction Equation:

$2AgN0_3$ (aq.) + Cu (s) $Cu(N0_3)_2$ (aq.) +2Ag (s)

16. Question

What type of reactions are represented by the following equations ?

(i) $CaC0_3 \rightarrow CaO + CO_2$

(ii) $CaO + H_2O \rightarrow Ca(OH)_2$

(iii) $2FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

(iv) $NH_4CI \rightarrow NH_3 + HCl$

(v) $2Ca + O_2 \rightarrow 2CaO$

Answer

(i) Decomposition Reaction.

(ii) Combination Reaction.

(iii) Decomposition Reaction.

(iv) Decomposition Reaction.

(v) Combination Reaction.

16. Question

What type of chemical reactions take place when:

(a) a magnesium wire is burnt in air?

(b) lime-stone is heated?

(c) silver bromide is exposed to sunlight

(d) electricity is passed through water?

(e)ammonia and hydrogen chloride are mixed?

Answer

(a) Combination Reaction

(b) Decomposition Reaction

(c) Decomposition Reaction

(d) Decomposition Reaction

(e)Combination Reaction

17. Question

What type of chemical reactions are represented by the following equations?

(i) A + BC → AC + B

(ii) A + B → C

(iii) X → Y + Z

(iv) PQ + RS → PS + RQ

(v) A203 + 2B → B203 + 2A

Answer

(i) Displacement reaction.

(ii) Combination Reaction.

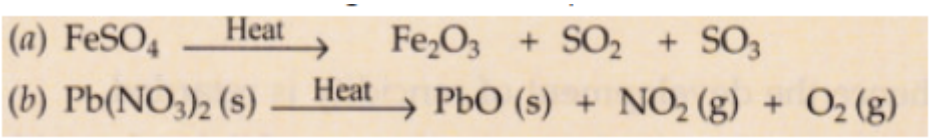
(iii) Decomposition reaction.

(iv) Double Displacement Reaction.

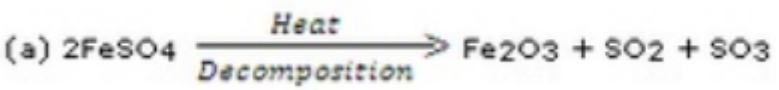
(v) Displacement reaction.

18. Question

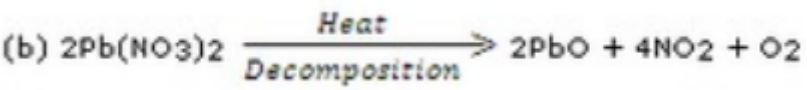
Balance the following chemical equations:



Answer



Ferrous sulphate decomposed to ferric oxide, Sulphur dioxide and Sulphur trioxide.



Lead (II) nitrate decomposes into lead mono oxide, nitrogen dioxide and oxygen gas.

19. Question

Which of the following is a combination and which is a displacement reaction?

(a) $Cl_2 + 2KI \longrightarrow 2KCl + I_2$

(b) $2K + Cl_2 \longrightarrow 2KCl$

Answer

(a) It is a Displacement Reaction.

(b) It is a Combination Reaction.

20. Question

What type of reactions are represented by the following equations?

(a) $CaO + CO_2 \longrightarrow CaCO_3$

(b) $2Na + 2H_2O \longrightarrow 2NaOH + H_2$

(c) $Mg + CuS0_4 \longrightarrow MgSO_4 + Cu$

(d) $NH_4NO_2 \longrightarrow N_2 + 2H_2O$

(e) $CuS0_4 + 2NaOH \longrightarrow Cu(OH)_2 + Na_2SO_4$

Answer

(a) It represents Combination Reaction.

(b) It represents Displacement reaction.

(c) It represents Displacement reaction.

(d) It represents Decomposition reaction.

(e) It represents Double displacement reaction.

21. Question

In the following reaction between lead sulphide and hydrogen peroxide :

$$PbS(s) + 4H_2O(aq) \rightarrow PbSO_4(s) + 4H_2O(I)$$

(a) Which substance is reduced?

(b) Which substance is oxidised?

Answer

(a) H_2O_2 is reduced.

(b) PbS is Oxidised.

22. Question

Identify the component oxidised in the following reaction:

$$H_2S + Cl_2 \longrightarrow S + 2HCl$$

Answer

H_2S is oxidized.

23. Question

When $S0_2$ gas is passed through saturated solution of H_2S, the following reaction occurs :

$$SO_2 + 2H_2S \longrightarrow 2H_2O + 3S$$

In this reaction, which substance is oxidized and which one is reduced?

Answer

H_2S is oxidized, Whereas SO_2 is Reduced.

24. Question

Fill in the following blanks with suitable words:

(a) The addition of oxygen to a substance is called ..... whereas removal of oxygen is called.....

(b) The addition of hydrogen to a substance is called ..... whereas removal of hydrogen is called.....

(c) Anti-oxidants are often added to fat containing foods to prevent .....due to oxidation.

Answer

(a) The addition of oxygen to a substance is called “Oxidation” whereas removal of oxygen is called “reduction”.

(b) The addition of hydrogen to a substance is called “reduction” whereas removal of hydrogen is called “oxidation”.

(c)Anti-oxidants are often added to fat containing foods to prevent “rancidity” due to oxidation.

Short Answer Type Questions-Pg-46

25. Question

What is an oxidation reaction? Identify in the following reaction

(i) the substance oxidised, and

(ii) the substance reduced:

$ZnO + C \rightarrow Zn + CO$

Answer

Oxidation reaction represents loss of electron or bonding of an element with oxygen. Addition of oxygen in a reaction is also termed as oxidation

(i) C, carbon is oxidized.

(ii) ZnO, Zinc oxide is reduced.

26. Question

(a) What is a redox reaction? Explain with an example.

(b) When a magnesium ribbon burns in air with a dazzling flame and forms a white ash, is magnesium oxidized or reduced? Why?

(c) In the reaction represented by the equation:

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

(i) name the substance oxidised.

(ii) name the oxidising agent.

(iii) name the substance reduced.

(iv) name the reducing agent.

Answer

(a) Oxidation and reduction happening simultaneously in a reaction is called redox reaction.

$$\underset{\text{Copper Oxide}}{CuO} + \underset{\text{Hydrogen}}{H_2} \xrightarrow{Heat} \underset{\text{Copper}}{Cu} + \underset{\text{Water}}{H_2O}$$

In the above reaction, copper oxide is reduced to copper whereas hydrogen is oxidized to water.

(b)Magnesium is oxidized because oxygen is added to magnesium creating MgO which leads to the ribbon burning with dazzling flame

(c) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$ (i) HCl is oxidized.

(ii)MnO_2 is oxidizing agent.

(iii)MnO_2 is getting reduced.

(iv) HCl is reducing agent.

27. Question

(a) Define a combination reaction.

(b) Give one example of a combination reaction which is also exothermic.

(c) Give one example of a combination reaction which is also endothermic.

Answer

(a)Reaction in which two or more substances combine to form a single substance are called combination reaction.

(b) C (s) + O_2 (g) $\rightarrow$ CO_2 + Heat

Reaction is exothermic as heat is given from the reaction.

(c) N_2 (g) + O_2 (g) + Heat $\rightarrow$ 2NO (g)

Reaction is endothermic as heat is given to the reaction.

28. Question

(a) Give an example of an oxidation reaction.

(b) Is oxidation an exothermic or an endothermic reaction?

(c) Explain, by giving an example, how oxidation and reduction proceed side by side.

Answer

(a) C (s) + O_2 (g) $\rightarrow$ CO_2 + Heat

Carbon is oxidized to form carbo dioxide.

(b)Oxidation is an exothermic reaction as heat is given by reaction to the surrounding.

(c) $CuO + H_2 \xrightarrow{Heat} Cu + H_2O$

Copper Oxide Hydrogen Copper Water

Copper oxide is reduced to copper element and hydrogen gas is oxidized to Dihydrogen oxide(water).

29. Question

(a) What is the colour of ferrous sulphate crystals? How does this colour change after heating?

(b) Name the product formed on strongly heating ferrous sulphate crystals. What type of chemical reaction occurs in this change?

Answer

(a) Ferrous sulphate crystals are green in colour. After heating crystals changes to Brown.

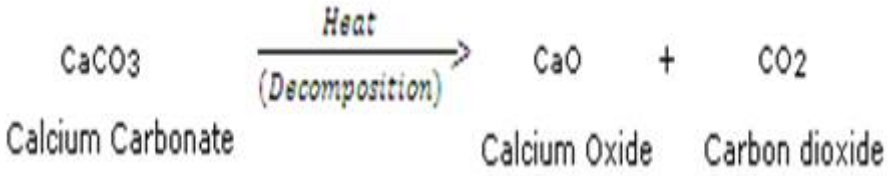
(b) Ferric oxide is formed on strongly heating Ferrous sulphate crystals. Dispalcement reaction occurs in this change.

30. Question

What is a decomposition reaction? Give an example of a decomposition reaction. Describe an activity to illustrate such a reaction by heating.

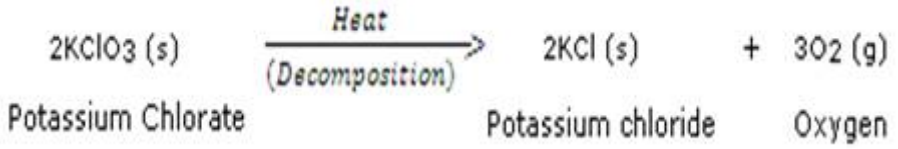
Answer

When in a reaction compound splits two or more simpler substance the reaction is called decomposition reaction.



Cacium carbonate decomposes when heated into calcium oxide and carbon dioxide.

Activity: Potassium chlorate decomposes to give Potassium chloride and oxygen, when heated in presence of catalyst manganese dioxide.



Potassium Chlorate a single compound, is splitting up into two simpler substances, potassium Chloride and oxygen. This decomposition reaction is used to prepare oxygen gas in laboratory.

31. Question

Zinc oxide reacts with carbon, on heating, to form zinc metal and carbon monoxide. Write a balanced chemical equation agent, and

(i) Oxidising agent

(ii) reducing agent, in this reaction.

Answer

$ZnO + C \rightarrow Zn + CO$

Above equation is the balanced chemical equation.

(i) the oxidizing agent is Zinc oxide.

(ii) the reducing agent is carbon.

32. Question

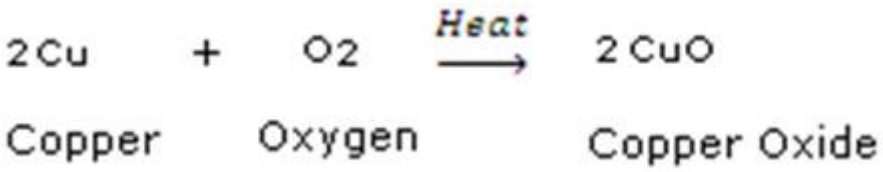
Give one example of a oxidation -reduction reaction which is also:

(a) a combination reaction

(b) a displacement reaction

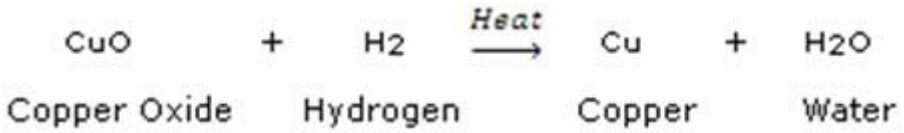
Answer

(a)



Copper combines with oxygen to form copper oxide and it is also a oxidation-reduction reaction.

(b)



Here hydrogen displaces copper to form dihydrogen oxide(water).

33 A. Question

What is the difference between displacement and double displacement reactions ? Write equations for these reactions.

Answer

In displacement reaction one element takes place of other element in a compound.

Chemical Equation:

$CuSO_4$ (aq) + Zn (s) $\rightarrow$ $ZnSO_4$ + Cu

In double displacement reaction two compounds react by an exchange of ions to form two new compounds.

Chemical equation:

$AgNO_3$ (aq) + NaCl (aq) $\rightarrow$ AgCl (s)+ $NaNO_3$ (aq)

33 B. Question

What do you mean by a precipitation reaction? Explain giving an example.

Answer

Reaction in which an insoluble solid(precipitate) is formed which separates from the solution is called a precipitation reaction.

Ex- Barium Chloride and Sodium sulphate solution reacts to form a white precipitate called Barium sulphate is a precipitation reaction.

$$BaCl_2\,(aq) + Na_2SO_4\,(aq) \rightarrow BaSO_4\,(s) + 2NaCl\,(aq)$$

Barium Chloride — Sodium sulphate — Barium sulphate (White ppt.) — Sodium Chloride

34 A. Question

Explain the following in terms of gain or loss of oxygen with one example each:

(i) oxidation (ii) reduction

Answer

(a) $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(1)$

(i) In the above reaction hydrogen gains oxygen and is oxidized forming dihydrogen oxide.

(ii) In the above reaction Copper loses Oxygen And is reduced forming copper metal.

34 B. Question

When copper powder is heated strongly in air, it forms copper oxide. Write a balanced chemical equation for this reaction. Name (i) substance oxidised, and (ii) substance reduced.

Answer

Balanced Equation:

$2Cu + O_2 \rightarrow 2Cu0$

(i) oxidized substance- Cu

(ii) Reduced substance – O_2

35 A. Question

Define the following in terms of gain or loss of hydrogen with one example each:

(i) oxidation (ii) reduction

Answer

(a) $H_2S + Cl_2 \rightarrow S + 2HCl$

(i) In the reaction hydrogen is removed from H_2S.So, by definition removal of hydrogen is called oxidation, so, hydrogen sulphide is oxidized.

(ii) Hydrogen is being added to Chlorine, so, Chlorine is reduced to hydrogen chloride.

35 B. Question

When a magnesium ribbon is heated, it burns in air to form magnesium oxide. Write a balanced chemical equation for this reaction. Name (i) substance oxidised, and (ii) substance reduced.

Answer

$2Mg + O_2 \rightarrow 2Mg0$

(i) Mg is oxidized

(ii) O_2 is reduced.

36. Question

What is meant by

(a) displacement reaction, and

(b) double displacement reaction? Explain with the help of one example each.

Answer

(a) The reaction in which one element takes place of another element is called displacement reactions.

Ex- $CuSO_4$ (aq.) + Zn (s) → $ZnSO_4$ + Cu

When zinc is added to copper sulphate solution, then zinc displaces copper from its aqueous solution forming Zinc sulphate(aq.) and Copper metal. Here, copper is displaced by Zinc from its compound.

(b) The reation in which two compound react by an exchange of ions to form two new compounds are called double displacement reactions.

Ex- $AgNO_3$ (aq.) + NaCl (aq.) → AgCl (s)+ $NaNO_3$ (aq.)

Here, Silver and sodium displaces each other from their aqueous solution to form Silver chloride(solid) and Sodium nitrate (aqueous).

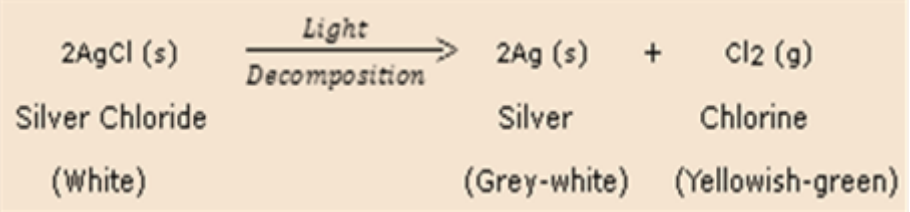
37 A. Question

Why are decomposition reactions called the opposite of combination reactions? Explain with equations of these reactions.

Answer

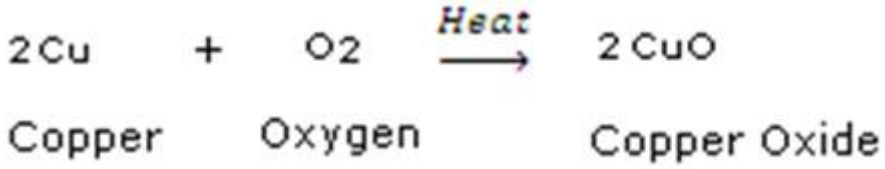
In decomposition reaction one compound decomposes to give two simpler compound or element whereas in combination reaction two different compound or element fuses or combine to form one single compound.

Ex- Decomposition Reaction:



Here Agcl(s) decomposes to give Ag(s) and Cl(s)

Combination Reaction:



Here, Copper and Oxygen combine to give Copper Oxide.

37 B. Question

Express the following facts in the form of a balanced chemical equation:

"When a strip of copper metal is placed in a solution of silver nitrate, metallic silver is precipitated and a solution containing copper nitrate is formed".

Answer

$Cu\ (s) + 2AgN0_3\ (aq.) \rightarrow Cu(N0_3)_2\ (aq.) + 2Ag\ (s)$

Copper displaces Silver to form copper Nitrate solution and Silver metal is formed as precipitate.

38 A. Question

What happens when a piece of iron metal is placed in copper sulphate solution? Name the type of reaction involved.

Answer

Iron sulphate and copper metal is fromed if a piece of iron metal is placed in copper sulphate solution.This is a type of displacement reaction.

$CuSO_4$ (aq)	+	Fe (s)	→	$FeSO_4$ (aq)	+	Cu (s)
Copper Sulphate		Iron		Ferrous sulphate		Copper

38 B. Question

Write balanced chemical equation with state symbols for the following reaction:

Barium chloride solution reacts with sodium sulphate solution to give insoluble barium sulphate and a solution of sodium chloride.

Answer

the chemical equation is:

$BaCl_2$ (aq)	+	Na_2SO_4 (aq)	→	$BaSO_4$ (s)	+	2NaCl (aq)
Barium Chloride		Sodium sulphate		Barium sulphate (White ppt.)		Sodium Chloride

39. Question

In the reaction represented by the following equation:

$$CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(1)$$

(a) name the substance oxidized

(b) name the substance reduced

(c) name the oxidizing agent

(d) name the reducing agent

Answer

(a) Hydrogen, H_2

(b) Copper oxide, CuO

(c) CuO, Copper oxide

(d) Hydrogen, H_2

40. Question

What happens when silver nitrate solution is added to sodium chloride solution?

(a) Write the equation for the reaction which takes place.

(b) Name the type of reaction involved.

Answer

A white precipitate of Silver chloride is formed along with sodium nitrate solution from a reaction of Silver nitrate solution and Sodium chloride solution.

(a) $AgNO_3$ (aq) + NaCl (aq) AgCl (s)+ $NaNO_3$ (aq)

(b) It is a double displacement reaction.

41. Question

What happens when silver chloride is exposed to sunlight? Write a chemical equation for this reaction. Also give one use of such a reaction.

Answer

When silver chloride is exposed to light it will decompose to form Silver Metal and chlorine gas.

$2AgCl(s) \rightarrow 2Ag(s) + Cl_2$

In presence of light.

This reaction is used in black nad white photography.

42. Question

What happens when a zinc strip is dipped into a copper sulphate solution ?

(a) Write the equation for the reaction that takes place.

(b) Name the type of reaction involved.

Answer

Zinc sulphate Solution and copper are obtained when a strip of zinc metal is placed in copper Sulphate Solution.

(a) $CuSO_4(aq.) + Zn(s) \dashrightarrow ZnSO_4(aq.) + Cu(s)$

(b) It is a displacement reaction.

Long Answer Type Questions-Pg-48

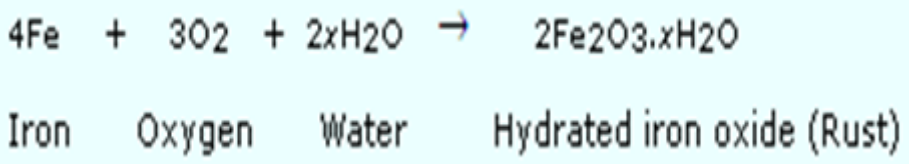
43 A. Question

Explain the term "corrosion" with an example. Write a chemical equation to show the process of corrosion of iron.

Answer

Corrosion is a natural process, which converts a refined metal to a more chemically-stable form, such as its oxide, hydroxide, or sulfide. Rusting of iron metal is the most common form of corrosion.

Iron metal in presence of moisture and oxygen froms Hydrated iron oxide which is called rust.



43 B. Question

What special name is given to the corrosion of iron?

Answer

Corrosion of Iron is called Rusting in which brown colour Iron oxide is formed.

43 C. Question

What type of chemical reaction is involved in the corrosion of iron?

Answer

Oxidation Reaction is involved in the corrosion of Iron .Corrosion is caused by the oxidation of metals by the oxygen present in air.

43 D. Question

Name any three objects (or structures) which are gradually damaged by the corrosion of iron and steel.

Answer

Bridges, Iron poles, Railings.

44 A. Question

Explain the term "rancidity". What damage is caused by rancidity?

Answer

The condition in which aerial oxidation of fats and oils in foods marked by unpleasant smell and taste is called rancidity. Food materials are spoiled if kept for a considerable time by rancidity and become unfit for consumption.

44 B. Question

What type of chemical reaction is responsible for causing rancidity?

Answer

Oxidation reaction is responsible for rancidity which spoils the food by oxidizing fats and oils contained in it.

44 C. Question

State and explain the various methods for preventing or retarding rancidity of food.

Answer

(i) adding anti-oxidants to food containing fats and oils.

(ii) It can be prevented by packaging fat and oil containing food with nitrogen gas which will ensure no presence of oxygen.

(iii) Refrigeration can retard rancidity.

(iv) Storing food in air-tight container.

(v) Keeping food in a dark place.

45 A. Question

What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride?

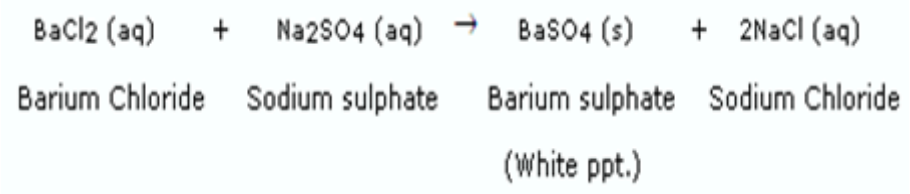
Answer

If Barium Chloride solution is added to Sodium sulphate solution a white precipitate of Barium sulphate wil form along with Sodium chloride solution.

45 B. Question

Write the balanced chemical equation for the reaction which takes place.

Answer



45 C. Question

State the physical conditions of reactants in which the reaction will not take place.

Answer

If the reactants are solid then the reaction will not proceed.

45 D. Question

Name the type of chemical reaction which occurs.

Answer

Double displacement reaction is occurring in between the chemicals.

45 E. Question

Give one example of another reaction which is of the same type as the above reaction.

Answer

Reaction between Silver nitrate solution and Sodium chloride solution is a double displacement reaction in which a white precipitate of Silver chloride and Sodium nitrate solution is formed.

Multiple Choice Questions (MCQs)-Pg-48

46. Question

The removal of oxygen from a substance is called: A. oxidation

B. corrosion

C. reduction

D. rancidity

Answer

Removing oxygen from a compound is a reduction reaction.

47. Question

In the context of redox reactions, the removal of hydrogen from a substance is known as: A. oxidation

B. dehydration

C. reduction

D. dehydrogenation

Answer

Removal of hydrogen in a redox reaction is oxidation.

48. Question

The chemical reaction involved in the corrosion of iron metal is that of : A. oxidation as well as displacement

B. reduction as well as combination

C. oxidation as well as combination

D. reduction as well as displacement

Answer

Iron and oxygen combine to form iron oxide. So, Iron is oxidized and it combine with oxygen.

49. Question

The term used to indicate the development of unpleasant smell and taste in fat and oil containing foods due to aerial oxidation is: A. acidity

B. radioactivity

C. rabidity

D. rancidity

Answer

Rancidity is a phenomenon in which fats and oils in food get oxidized and leave unpleasant smell and taste in food.

50. Question

In order to prevent the spoilage of potato chips, they are packed in plastic bags in an atmosphere of : A. CI_2

B. H_2

C. N_2

D. O_2

Answer

Nitrogen ensure that there is no free oxygen left in the packet.

51. Question

A white precipitate can be obtained by adding dilute sulphuric acid to: A. $CuS0_4$ solution

B. NaCl solution

C. $BaCl_2$ solution

D. Na_2SO_4

Answer

Sulphuric acid will react with to form white barium sulphide.

52. Question

A white precipitate will be formed if we add common salt solution to: A. $Ba(NO_3)_2$ solution

B. KNO_3 solution

C. $AgNO_3$ solution

D. $Mg(NO_3)_2$ Solution

Answer

Common salt will react with Silver nitrate to form a white precipitate.

53. Question

Consider the following equation of the chemical reaction of a metal M:

This equation represents:

A. combination reaction as well as reduction reaction

B. decomposition reaction as well as oxidation reaction

C. oxidation reaction as well as displacement reaction

D. combination reaction as well as oxidation reaction

Answer

Here, metal is oxidsed and combined with oxygen.

54. Question

The process of respiration is: A. an oxidation reaction which is endothermic

B. a reduction reaction which is exothermic

C. a combination reaction which is endothermic

D. an oxidation reaction which is exothermic

Answer

Respiration is a oxidation reaction in which oxygen is used and heat is produced.

55. Question

Which of the following can be decomposed by the action of light? A. NaCl

B. KCl

C. AgCl

D. CuCl

Answer

AgCl decomposes in light to give Silver and Chlorine.

56. Question

Consider the reaction:

$$KBr(aq) AgNO_3(aq) \rightarrow KNO_3(aq) + AgBr(s)$$

This is an example of:

A. Decomposition reaction

B. Combination reaction

C. Double displacement reaction

D. Displacement reaction

Answer

It is a Double displacement reaction. K and Ag displaces each other from their compound and form newer compounds.

57. Question

You are given the following chemical equation:

$Mg\ (s) + CuO\ (s) \rightarrow MgO\ (s) + Cu(s)$

This equation represents:

A. Decomposition reaction as well as displacement reaction.

B. Combination reaction as well as double displacement reaction.

C. Redox reaction as well as displacement reaction.

D. Double displacement reaction as well as redox reaction.

Answer

Here, Magnesium is oxidized and copper is displaced from its compound.

Questions Based on High Order Thinking Skills (HOTS)-Pg-49

58. Question

When a green iron salt is heated strongly, its colour finally changes to brown and odor 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 reaction involved.

Answer

(a) Name of the Salt is Ferrous sulphate.

(b) It is a Decomposition reaction

(c) Ferrous sulphate decomposes to give Ferric Oxide, Sulphur dioxide and Sulphur trioxide.

59. Question

A colourless lead salt, when heated, produces a yellow residue and brown fumes.

(a) Name the lead salt.

(b) Name the brown fumes.

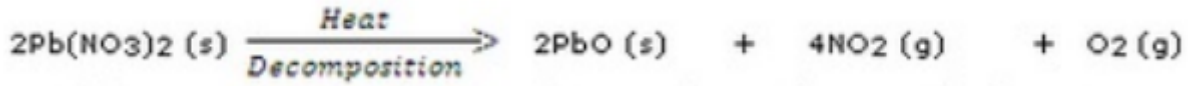
(c) Write a chemical equation of the reaction involved.

Answer

(a) Name of the salt is Lead nitrate.

(b) Brown fumes is the compound Nitrogen dioxide.

(c) The chemical Equation of reaction.



60. Question

When hydrogen burns in oxygen, water is formed and when water is electrolysed, then hydrogen and oxygen are produced. What type of reaction takes place:

(a) in the first case?

(b) in the second case?

Answer

(a) In the first case it is a combination reaction.

(b) In the second case it is a Decomposition reaction.

61. Question

A strip of metal X is dipped in a blue coloured salt solution YSO_4. After some time, a layer of metal Y form the salt solution is formed on the surface of metal strip X. Metal

X is used in galvanization whereas metal Y is used in making electric wires. Metal X and metal Y together form an alloy Z.

(a) What could metal X be?

(b) What could metal Y be?

(c) Name the metal salt YSO_4.

(d) What type of chemical reaction takes place when metal X reacts with salt solution YSO_4? Write the equation of the chemical reaction involved.

(e) Name the alloy Z.

Answer

(a) Metal X is Zinc(Zn).

(b) Metal Y is Copper(Cu)

(c) Metal Salt is Copper Sulphate($CuSO_4$).

(d) Displacement Reaction takes place.

The chemical equation:

$CuSO_4$ (aq) + Zn (s) $\rightarrow$ $ZnSO_4$ (aq) + Cu (s)

(e) Alloy Z is Brass.

62. Question

When a black metal compound XO is heated with a colourless gas Y_2, then metal X and another compound Y_2O are formed. Metal X is red-brown in colour which does not react with dilute acids at all. Gas Y_2 can be prepared by the action of a dilute acid on any active metal. The compound Y_2O is a liquid at room temperature which can turn anhydrous copper sulphate blue.

(a) What do you think is metal X?

(b) What could be gas Y_2?

(c) What is compound XO?

(d) What is compound Y_2O?

(e) Write the chemical equation of the reaction which takes place on heating XO with Y_2.

(f) What type of chemical equation of the reaction which takes place on heating XO with Y_2.

Answer

(a) Metal X is Copper.

(b) Gas Y_2 is Hydrogen.

(c) Compound XO is copper oxide (CuO).

(d) Compound Y_2O is Water.

(e) The chemical Equation:

$CuO + H_2 \rightarrow Cu + H_2O$

(f)Displacement Reaction (also redox) takes place.

63. Question

A metal X forms a water soluble salt XNO_3. When an aqueous solution of XNO3 is added to common salt solution, then a white precipitate of compound Y is formed along with sodium nitrate solution. Metal X is said to be the best conductor of electricity and it does not evolve hydrogen when put in dilute hydrochloric acid.

(a) What is metal X?

(b) What is salt XNO_3?

(c) Name the compound Y.

(d) Write the chemical equation of the reaction which takes place on reacting XN03 solution and common salt solution giving the physical states of all the reactants and products.

(e) What type of chemical reaction is illustrated by the above equation?

Answer

(a) Metal x is Silver(Ag).

(b) Salt XNO_3 is Silver Nitrate($AgNO_3$)

(c) Compound Y is Silver Chloride (AgCl).

(d) the chemical equation:

$AgNO_3$ (aq.) + NaCl (aq.) $\rightarrow$ AgCl (s) + $NaNO_3$ (aq.)

(e) Double Displacement Reaction takes place.

64. Question

Two metals X and Y form the salts XSO_4 and Y_2SO_4, respectively. The solution of salt XSO_4 is blue in colour whereas that of Y_2SO_4, is colourless. When barium

chloride solution is added to XSO_4 solution, then a white precipitate Z is formed along with a salt which turns the solution green. And when barium chloride solution is added to Y_2SO_4, solution, then the same white precipitate Z is formed along with colourless common salt solution.

(a) What could the metals X and Y be?

(b) Write the name and formula of salt XS04.

(c) Write the name and formula of salt Y2S04

(d) What is the name and formula of white precipitate Z?

(e) Write the name and formula of the salt which turns the solution green in the first case.

Answer

(a) Metal X is copper and Metal Y is Sodium.

(b) Name of Salt XSO_4 – Copper Sulphate

Formula- $CuSO_4$

(c) Name and Formula of salt of Y- Sodium Sulphate, Na_2SO_4

(d) name and formula of precipitate Z- Barium Sulphate, $BaSO_4$

(e)Name and formula of salt- Copper Chloride, $CuCl_2$

65. Question

A red-brown metal X forms a salt XSO_4. When hydrogen sulphide gas is passed through an aqueous solution of XSO_4, 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 XSO_4?

(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?

Answer

(a) Salt XSO_4 is Copper Sulphate.

(b) Colour of salt is “Blue”.

(c) Copper sulphidde is the black precipitate

(d) The chemical equation:

$CuSO_4$ (aq.) + H_2S (g) $\rightarrow$ CuS (s) + H_2SO_4 (aq.)

(e) Double displacement reaction takes place.

66. Question

When a strip of red-brown metal X is placed in a colourless salt solution YNO_3 then metal Y is set free and a blue coloured salt solution XNO_3H is formed. The liberated metal Y forms a shining white deposit on the strip of metal X.

(a) What do you think metal X is?

(b) Name the salt YNO_3.

(c) What could be metal Y?

(d) Name the salt $X(NO_3)_2$.

(e) What type of reaction takes place between metal X and salt solution YNO_3?

Answer

(a) Metal X is Copper.

(b) Salt YNO_3 is Silver Nitrate.

(c) Metal Y is Silver.

(d) Name of salt $X(NO_3)_2$ is Copper nitrate.

(e) Displacement reaction takes place.

67. Question

A metal salt MX when exposed to light splits up to form metal M and a gas X_2. Metal M is used in making ornaments whereas gas X_2 is used in making bleaching powder. The salt MX is itself used in black and white photography.

(a) What do you think metal M is?

(b) What could be gas X_2?

(c) Name the metal salt MX.

(d) Name any two salt solutions which on mixing together can produce a precipitate of salt MX.

(e) What type of chemical reaction takes place when salt MX is exposed to light? Write the equation of the reaction.

Answer

(a) Metal M is Silver.

(b) Gas X_2 is chlorine.

(c) Salt MX is Silver Chloride.

(d) Silver Nitrate and Sodium chloride on mixing together produce the same precipitate as MX.

(e) Decomposition reaction takes place.

The chemical equation:

$$2AgCl\ (s) \xrightarrow{Light} 2Ag\ (s) + Cl_2\ (g)$$