St.JOHN'S RESIDENTIAL PUBLIC SCHOOL

AFFILIATED TO C.B.S.E

SONAGOPALPUR, SAMPATCHAK, PATNA.7

ANSWERS OF ASSIGNMENT 1

STD...XTH *PREPARED BY .....S.K.VERMA*

CHEMICAL REACTIONS

Solution 1

Respiration is an exothermic process because energy is produced during this process.

Solution 2

A balanced chemical equation has equal number of atoms of different elements in the reactants and products.

Solution 3

When quicklime is added to water, it forms slaked lime along with evolution of heat. There will be a rise in temperature of the bucket.

Solution 4

Magnesium ribbon should be cleaned before burning in air to remove the protective layer of basic magnesium oxide from its surface.

Solution 5

False.

Solution 6

Oxygen should be in molecular form, O_2

$2Mg + O_2 \rightarrow 2MgO$

Solution 7

The symbol (aq) represents aqueous solution , means containing water in the solution.

Solution 8

Photosynthesis is an endothermic reaction because sunlight energy is absorbed by green plants during this process.

Solution 9

(a) Aqueous solution is indicated by the symbol 'aq'.
(b) An exothermic reaction is indicated by writing "+Heat" or "+Heat energy" or "+Energy" on the products side of an equation.
(c) An endothermic reaction is indicated by writing "+Heat" or "+Heat energy" or "+Energy" on the reactants side of an equation.

Solution 10

(a) $2H_2S + 3O_2 \rightarrow 2H_2O + 2SO_2$
(b) $P_4 + 5O_2 \rightarrow 2P_2O_5$
(c) $CS_2 + 3O_2 \rightarrow CO_2 + 2SO_2$

(d) $2Al + Fe_2O_3 \rightarrow Al_2O_3 + 2Fe$
(e) $BaCl_2 + ZnSO_4 \rightarrow ZnCl_2 + BaSO_4$

Solution 11

(a) $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$
(b) $2Al + 3CuCl_2 \rightarrow 2AlCl_3 + 3Cu$

Solution 12

(a) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$
(b) $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

Solution 13

(i) $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$
(ii) $N_2 + 3H_2 \rightarrow 2NH_3$

Solution 14

(a) $Ca\ (s) + 2H_2O\ (l) \rightarrow Ca(OH)_2\ (aq) + H_2\ (g)$
(b) $2SO_2\ (g) + O_2\ (g) \rightarrow 2SO_3\ (g)$

Solution 15

(i) $4Na + O_2 \longrightarrow 2Na_2O$

(ii) $2H_2O_2 \longrightarrow 2H_2O + O_2$

(iii) $Mg(OH)_2 + 2HCl \longrightarrow MgCl_2 + 2H_2O.$

(iv) $4Fe + 3O_2 \longrightarrow 2Fe_2O_3$

(v) $2Al(OH)_3 \longrightarrow Al_2O_3 + 3H_2O$

(vi) $2NH_3 + 3CuO \longrightarrow 3Cu + N_2 + 3H_2O$

(vii) $Al_2(SO_4)_3 + 6NaOH \longrightarrow 2Al(OH)_3 + 3Na_2SO_4$

(viii) $2HNO_3 + Ca(OH)_2 \longrightarrow Ca(NO_3)_2 + 2H_2O$

(ix) $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$

(x) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$

Solution 16

(a) Conservation of mass

(b) Aqueous; (aq)

Solution 17

(a)Magnesium Ribbon is heated in the presence of air to form a white powder called magnesium oxide.

(b) When dilute sulphuric acid is poured over zinc granules

(i) there will be a rise in temperature

(ii) evolution of hydrogen gas.

(c) (i) A yellow precipitate is formed.

(ii) There will be a change in color (from colourless to yellow).

Solution 18

(a) The method of representing a chemical reaction with the help of symbols and formulae of substances involved in it is called a chemical equation.
Example: Zinc metal reacts with dilute sulphuric acid to form zinc sulphate and hydrogen gas.
This equation is written as:

$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$

(b) A balanced chemical equation has an equal number of atoms of different elements in the reactants and products side. It has equal masses of various elements in the reactants and products.

Example: $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$

An unbalanced chemical equation has an unequal number of atoms of one or more elements in the reactants and products side. It has unequal masses of various elements in the reactants and products.

Example: $H_2 + O_2 \longrightarrow H_2O$

(c) (i) $2NH_3 \longrightarrow N_2 + 3H_2$

(ii) $C + CO_2 \longrightarrow 2CO$

Solution 19

$H_2 + CuO \longrightarrow Cu + H_2O$

(i) Elements : H_2 and Cu
(ii) Compounds : CuO and H_2O
(iii) Reactants: H_2 and CuO
(iv) Products: Cu and H_2O
(v) Metal: Cu
(vi) Non-metal: H_2

Solution 20

$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$

Solution 21

(a)A balanced chemical equation has an equal number of atoms of different elements in the reactants and products. It has equal masses of various elements in the reactants and products. A chemical equation should be balanced to satisfy the law of conservation of chemical reactions.

(b) $2Al + 3Cl_2 \longrightarrow 2AlCl_3$
(c) $2K + 2H_2O \longrightarrow 2KOH + H_2$

Solution 22

(a) The physical states of the reactants and products are shown by putting the "state symbols" in an equation.
For example: $Zn\ (s) + H_2SO_4\ (aq) \longrightarrow ZnSO_4\ (aq) + H_2\ (g)$

(b) $Zn\ (s) + 2HCl\ (aq) \longrightarrow ZnCl_2\ (aq) + H_2\ (g)$
(c) $FeSO_4(aq) + 2NaOH\ (aq) \longrightarrow Fe(OH)_2\ (s) + Na_2SO_4\ (aq)$

Solution 23

(a) $2Al(OH)_3 + 3H_2SO_4 \longrightarrow Al_2(SO_4)_3 + 6H_2O$

(b) $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$

Solution 24

(a) $MgCO_3\ (s) + 2HCl\ (aq) \longrightarrow MgCl_2\ (aq) + CO_2\ (g) + H_2O\ (l)$

(b) $2NaOH\ (aq) + H_2SO_4\ (aq) \longrightarrow Na_2SO_4\ (aq) + 2H_2O\ (l)$

Solution 25

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

(b) $2Mg + CO_2 \longrightarrow 2MgO + C$

Solution 26

(a) $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$

(b) $NaOH\ (aq) + HCl\ (aq) \longrightarrow NaCl\ (aq) + H_2O\ (l)$

Solution 27

$4NH_3\ (g) + 3O_2\ (g) \longrightarrow 2N_2\ (g) + 6H_2O\ (l)$

Solution 28

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

Carbon dioxide Water Glucose Oxygen

Solution 29

$3BaCl_2\ (aq) + Al_2(SO_4)_3\ (aq) \longrightarrow 3BaSO_4\ (s) + 2AlCl_3\ (aq)$

Solution 30

$2KNO_3\ (s) \longrightarrow 2KNO_2\ (s) + O_2\ (g)$

Solution 31

(a) Chemical reactions are the processes in which new substances with new properties are formed.
For example: When magnesium ribbon is heated, it burns in air to form a white powder called magnesium oxide.

(b) (i) When dilute Hydro chloric acid react with Zinc granules.

(ii) The chemical reaction between citric acid and purple coloured potassium permanganate solution is characterized by change in colour (from purple to colourless).

(iii) A reaction between Sodium sulphate and Barium chloride.

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

(v) When wax is burned, then water and carbon dioxide are formed. Wax is a solid; water is a liquid whereas carbon dioxide is a gas.

Solution 32

(a) The various characteristics of chemical reactions are:
(i) Evolution of a gas
(ii) Formation of a precipitate
(iii) Change in colour
(iv)Change in temperature
(v) Change in state.

(b) (i) Evolution of carbon dioxide gas

(ii) Change in colour from purple to colourless

(iii) Formation of white precipitate of barium sulphate

(iv) Change in temperature

(v) Change in state from solid to liquid and gas.

Solution 33

(a) Those reactions in which heat is evolved are known as ***exothermic reactions.***
The reactions in which heat is absorbed are known as ***endothermic reactions.***

(b) Example of ***exothermic reaction***:

$C(s) + O_2(g) \longrightarrow CO_2 + \text{Heat}$

Example of ***endothermic reaction***:

$N_2(g) + O_2(g) + \text{Heat} \longrightarrow 2NO(g)$

(c) ***Endothermic reactions:***

Photosynthesis, Electrolysis of water, Decomposition of calcium carbonate.

Exothermic reactions:

Burning of natural gas, Respiration.

Solution 34

(a) Lead nitrate.
(b) Lead iodide.
(c) Formation of a precipitate.
(d) $Pb(NO_3)_2\,(aq) + 2KI\,(aq) \longrightarrow PbI_2\,(s) + 2KNO_3\,(aq)$

Solution 35

(a) Calcium oxide, CaO.
(b) Calcium hydroxide, $Ca(OH)_2$
(c) Lime water.
(d) $CaO + H_2O \longrightarrow Ca(OH)_2$
(e) Change in temperature.

Solution 36

(a) Magnesium, Mg.
(b) Magnesium oxide, MgO
(c) Oxygen (of air), O_2
(d) Magnesium hydroxide, $Mg(OH)_2$; Used as antacid to relieve indigestion
(e) $2Mg + O_2 \longrightarrow 2MgO$

Solution 37

(a) Sodium, Na.
(b) Sodium hydroxide solution (NaOH solution), Alkaline.
(c) Hydrogen, H_2
(d) $2Na + 2H_2O \longrightarrow 2NaOH + H_2$
(e) Exothermic.

Solution 38

(a) Carbon dioxide, CO_2
(b) Water, H_2O
(c) Sunlight.

(d) Chlorophyll; Green leaves of plants.
(e) Glucose, $C_6H_{12}O_6$
(f) Oxygen; Photosynthesis.

Solution 39

Decomposition reaction.

Solution 40

The various types of chemical reactions are:

(i) Combination reactions.
(ii) Decomposition reaction.
(iii) Displacement reaction.
(iv) Double displacement reaction.
(v) Oxidation and reduction reactions.

Solution 41

The colour of copper sulphate solution changes when iron nail is kept immersed in it due to the displacement reaction taking place between iron and copper leading to formation of iron sulphate.

Solution 42

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

Solution 43

Rancidity.

Solution 44

Anti-oxidants.

Solution 45

The digestion of food in the body is an example of decomposition reaction.

Solution 46

Anti-oxidant is a substance which prevents oxidation. They are added to fat and oil containing foods so that they do not get oxidized easily and hence do not turn rancid.

Solution 47

Food products containing fats and oils are packaged in nitrogen so that there is no oxygen to cause oxidation of food and make it rancid.

Solution 48

(a) When fused sodium chloride is decomposed by passing electricity, sodium metal is obtained.
(b) When lead nitrate is heated strongly, it breaks down to form lead monoxide, nitrogen dioxide and oxygen.

Solution 49

Decomposition reactions (carried out by electricity).

Solution 50

Benzoic Acid , BHA (Butylated Hydroxy Anisole) and BHT (Butylated Hydroxy Toluene).

Solution 51

(a) Decomposition reaction where heat is supplied for energy:

$CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

(b) Decomposition reaction where light is supplied for energy:

$2AgCl \xrightarrow{\text{sunlight}} 2Ag + Cl_2$

(c) Decomposition reaction where electricity is supplied for energy:

$2H_2O \xrightarrow{\text{electricity}} 2H + O_2$

Solution 52

$2AgNO_3\ (aq) + Cu\ (s) \longrightarrow Cu(NO_3)_2\ (aq) + 2Ag\ (s)$

Solution 53

(a) Combination.
(b) Decomposition.
(c) Decomposition.
(d) Decomposition.
(e) Combination.

Solution 54

(a) Oxidation; reduction.
(b) Reduction; oxidation.
(c) Rancidity.

Solution 55

(a)Those reactions in which two or more substances combine to form a single substance is called a combination reaction.

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

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

Solution 56

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

(b) Oxidation reaction is an exothermic reaction.

(c)$CuO + H_2 \longrightarrow Cu + H_2O$

In this reaction, copper oxide is being reduced to copper whereas hydrogen is being oxidized to water.

Solution 57

(a) The colour of ferrous sulphate is green. It changes to brown after heating.
(b) The product formed is ferric oxide. This is a decomposition reaction.

Solution 58

Those reactions in which a compound splits up into two or more simpler substances is called a decomposition reaction.

When calcium carbonate is heated, it decomposes to give calcium oxide and carbon dioxide.

Activity: When potassium chlorate is heated in the presence of manganese dioxide catalyst, it decomposes to give potassium chloride and oxygen:

This decomposition takes place in the presence of heat and catalyst. In this decomposition reaction, a single compound, potassium chlorate, is splitting

up into two simpler substances, potassium chloride and oxygen. This decomposition reaction is used for preparing oxygen gas in the laboratory.

Solution 59

$ZnO + C \xrightarrow{heat} Zn + CO$

(i) Zinc oxide.
(ii) Carbon.

Solution 60

(a) $2Cu + O_2 \longrightarrow 2\,CuO$

(b) $CuO + H_2 \longrightarrow Cu + H_2O$

Solution 61

(a)Those reactions in which one element takes the place of another element in a compound, are known as displacement reactions.

Equation: $CuSO_4\,(aq) + Zn\,(s) \longrightarrow ZnSO_4 + Cu$

Those reactions in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions.

Equation:

$AgNO_3\,(aq) + NaCl\,(aq) \longrightarrow AgCl\,(s) + NaNO_3\,(aq)$

(b) Any reaction in which an insoluble solid (called precipitate) is formed that separates from the solution is called a precipitation reaction.
Example: The reaction between barium chloride and sodium sulphate solution to form a white barium sulphate precipitate (along with sodium chloride solution) is an example of a precipitation reaction.

Solution 62

When silver chloride is exposed to light, it decomposes to form silver metal and chlorine gas.

This reaction is used in black and white photography.

Solution 63

(a)Lead nitrate.

(b) Nitrogen dioxide.(NO_2)

(c) $2Pb(NO_3)_2 \xrightarrow{heat} 2PbO + 4NO_2 + O_2$

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