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**Assignment – I**

1. Write balanced chemical equations for each of the following reactions :
2. Zinc metal reacts with aqueous hydrochloric acid to produce a solution of zinc chloride and hydrogen gas.
3. When solid mercury (II) oxide is heated, liquid mercury and oxygen gas are produced.
4. Sodium metal reacts with water to form sodium hydroxide along with evolution of hydrogen gas.
5. Liquid hydrogen peroxide decomposes to form water and oxygen gas.
6. Acetylene/Ethyne (C2H2) gas burns in oxygen to form carbon dioxide and water along with evolution of heat.
7. Carbon dioxide gas is passed through lime water to form a precipitate of calcium carbonate.
8. Express the following reactions in the form of chemical equation and then balance these chemical equation :
9. Phosphorus burns in oxygen to form phosphorus pentoxide.
10. Silver is precipitated out when a copper strip is dipped in silver nitrate solution. The solution turns blue due to the formation of copper (II) nitrate.
11. Magnesium ribbon is burnt in a jar containing nitrogen gas when a white powder of magnesium nitride is obtained.
12. Burning of benzene (C6H6) in oxygen to give carbon dioxide and water.
13. Marble (calcium carbonate) dissolved in hydrochloric acid to give calcium chloride, water and carbon dioxide.
14. Sodium hydroxide reacts with sulphuric acid to form sodium sulphate and water.
15. Aluminium sulphate reacts with sodium hydroxide to form a precipitate of aluminium hydroxide while the solution after the reaction is found to contain sodium sulphate.
16. Write the equations for the following reactions in the ionic form and balance the ionic equation:
17. Magnesium is treated with dilute sulphuric acid.
18. Stannous chloride solution is added into mercuric chloride solution.
19. H2S gas is passed into copper (II) sulphate solution.

CHEMICAL REACTIONS & EQUATIONS Page No. 1

1. Balance the following chemical equations :

|  |  |
| --- | --- |
| 1. CS2 + O2 → CO2 + SO2 | 1. Mg + CO2 MgO + C |
| 1. CaC2 + H2O → Ca(OH)2 + C2H2 | 1. NH3 + O2 → N2 + H2O |
| 1. Al + HCl → AlCl3 + H2 | 1. SO2 + H2S → H2O + S |
| 1. H2S + O2 → SO2 + H2O | 1. Al (OH)3 Al2O3 + H2O |
| 1. BaCl2 + Al2(SO4)3 → AlCl3 + BaSO4 ↓ | 1. BaCl2 + H2SO4 → BaSO4 + HCl |
| 1. Zn + H+ → Zn2+ + H2 | 1. Fe + H+ → Fe2+ + H2 |
| 1. Br2 + I – → Br –  + I2 | 1. Na + H+ → Na+ + H2 |
| 1. HNO3 + Ca(OH)2 → Ca(NO3)2 + H2O | 1. NaOH + H2SO4 → Na2SO4 + H2O |
| 1. NaCl + AgNO3 → AgCl + NaNO3 | 1. Pb(NO3)2 + Fe2(SO4)3 → Fe(NO3)3 + PbSO4 ↓ |

1. Balance the following chemical equations :
2. Hydrogen + chlorine → Hydrogen chloride
3. Barium chloride + Aluminium sulphate → Barium sulphate + Aluminium chloride
4. Calcium hydroxide + Carbon dioxide → Calcium carbonate + Water
5. Zinc + Silver nitrate → Zinc nitrate + Silver
6. Aluminium + Copper chloride → Aluminium chloride + Copper
7. Barium chloride + Potassium sulphate → Barium sulphate + Potassium chloride
8. Balance the following chemical equations from the following reactions and identify the type of reaction in each case :
9. Potassium bromide (aq) + Barium iodide (aq) → Potassium iodide (aq) + Barium bromide (aq)
10. Zinc carbonate (s) → Zinc oxide (s) + carbon dioxide (g)
11. Magnesium (s) + hydrochloric acid (aq) → Magnesium chloride (aq) + Hydrogen (g)
12. Write a balanced chemical equation with state symbols for the following reactions :
13. Solution of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.
14. Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride and water.
15. Hydrogen gas combines with nitrogen to form ammonia
16. Hydrogen sulphide gas burns in air to give water and sulphur dioxide.
17. Barium chloride reacts with aluminium sulphate to give aluminium chloride and precipitate of barium sulphate.
18. Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

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**Answers**

1. 1. Zn (s) + 2 HCl (aq) → ZnCl2 (aq) + H2 (g) 2. 2 HgO (s) 2 Hg (l) + O2 (g)

3. 2 Na (s) + 2 H2O (l) → 2 NaOH (aq) + H2 (g) 4. 2 H2O2 (l) → 2 H2O (l) + O2 (g)

5. 2 C2H2 (g) + 5 O2 (g) → 4 CO2 (g) + 2 H2O (l)

6. Ca(OH)2 (aq) + CO2 (g) → CaCO3 (s) ↓ + H2O (l)

1. 1. P4 (s) 5 O2 (g) → 2 P2O5 (s) 2. Cu (s) + 2 AgNO3 (aq) → Cu(NO3)2 + 2 Ag ↓

3. 3 Mg (s) + N2 (g) → Mg3N2 4. 2 C6H6 15 O2 → 12 CO2 + 6 H2O

5. CaCO3 (s) + 2 HCl (aq) → CaCl2 (aq) + H2O (l) + CO2 (g)

6. 2 NaOH (aq) + H2SO4 (aq) → Na2SO4 (aq) + 2 H2O (l)

7. Al2(SO4)3 (aq) + 6 NaOH (aq) → 2 Al(OH)3 ↓ + 3 Na2SO4

1. 1. Mg + 2 H+ → Mg2+ + H2 2. Sn2+ + 2 Hg2+ → Sn4+ + 2 Hg+

3. Cu2+ (aq) + 2 H2S (g) → CuS (s) + 2 H+ (aq)

1. 1. CS2 + 3 O2 → CO2 + 2 SO2 2. 2 Mg + CO2 2 MgO + C

3. CaC2 + 2 H2O → Ca(OH)2 + C2H2 4. 4 NH3 + 3 O2 → 2 N2 + 6 H2O

5. 2 Al + 6 HCl → 2 AlCl3 + 3 H2  6. SO2 + 2 H2S → 2 H2O + 3 S

7. 2 H2S + 3 O2 → 2 SO2 + 2 H2O 8. 2 Al(OH)3 → Al2O3 + 3 H2O

9. 3 BaCl2 + Al2(SO4)3 → 2 AlCl3 + 3 BaSO4 ↓ 10. BaCl2 + H2SO4 → BaSO4 + 2 HCl

11. Zn + 2 H+ → Zn2+ + H2 12. Fe + 2 H+ → Fe2+ + H2

13. Br2 + 2 I – → 2 Br –  + I2 14. 2 Na + 2 H+ → 2 Na+ + H2

15. 2 HNO3 + Ca(OH)2 → Ca(NO3)2 + 2 H2O 16. 2 NaOH + H2SO4 → Na2SO4 + 2 H2O

17. NaCl + AgNO3 → AgCl + NaNO3

18. 3 Pb(NO3)2 + Fe2(SO4)3 → 2 Fe(NO3)3 + 3 PbSO4↓

1. 1. H2 + Cl2 → 2 HCl 2. 3 BaCl2 + Al2(SO4)3 → 3 BaSO4 + 2 AlCl3

3. Ca(OH)2 + CO2 → CaCO3 + H2O 4. Zn + 2 AgNO3 → Zn(NO3)2 + 2 Ag

5. 2 Al + 3 CuCl2 → 2 AlCl3 + 3 Cu 6. BaCl2 + K2SO4 → BaSO4 + 2 KCl

1. 1. 2 KBr + BaI2 → 2 KI + BaBr2 , double displacement reaction

2. ZnCO3 → ZnO + CO2 , combination reaction

3. Mg + 2 HCl → MgCl2 + H2 , displacement reaction

1. 1. BaCl2 + Na2SO4 → BaSO4 + 2 NaCl 2. NaOH + HCl → NaCl + H2O

3. N2 + 3 H2 → 2 NH3  4. 2 H2S + 3 O2 → 2 H2O + 2 SO2

5. 3 BaCl2 + Al2(SO4)3 → 3 BaSO4 + 2 AlCl3 6. 2 K + 2 H2O → 2 KOH + H2

CHEMICAL REACTIONS & EQUATIONS Page No. 3

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**Assignment – II**

1. Which of the following is not a physical change ?

|  |  |
| --- | --- |
| a) Boiling of water to give water vapour | b) Melting of ice to give water |
| c) Dissolution of salt in water | d) Combustion of Liquefied Petroleum Gas (LPG) |

1. The following reaction is an example of a 4 NH3 (g) + 5 O2 (g) → 4 NO (g) + 6 H2O

(i) displacement reaction (ii) combination reaction (iii) redox reaction (iv) neutralisation reaction

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) & (iv) | b) (ii) & (iii) | c) (i) & (iii) | d) (iii) & (iv) |

1. Which of the following statements about the given reaction are correct ?

3 Fe (s) + 4 H2O (g) → Fe3O4 (s) + 4 H2 (g)

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Iron metal is getting oxidised | | (ii) Water is getting reduced | |
| (iii) Water is acting as reducing agent | | (iv) Water is acting as oxidising agent | |
| a) (i) , (ii) & (iii) | b) (iii) & (iv) | c) (i) , (ii) & (iv) | d) (ii) & (iv) |

1. Which of the following are exothermic processes ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Reaction of water with quick lime | | (ii) Dilution of an acid | |
| (iii) Evaporation of water | | (iv) Sublimation of camphor (crystals) | |
| a) (i) & (ii) | b) (ii) & (iii) | c) (i) & (iv) | d) (iii) & (iv) |

1. Three beakers labelled as A, B and C each containing 25 ml of water were taken. A small amount of NaOH, anhydrous CuSO4 and NaCl were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement(s) is (are) correct ?

(i) In beakers A and B, exothermic process has occurred.

(ii) In beakers A and B, endothermic process has occurred

(iii) In beaker C, exothermic process has occurred

(iv) In beaker C, endothermic process has occurred

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) only | b) (ii) only | c) (i) & (iv) | d) (ii) & (iii) |

1. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation ?

a) KMnO4 is an oxidising agent, it oxidises FeSO4.

b) FeSO4­ acts as an oxidising agent and oxidises KMnO4.

c) The colour disappears due to dilution ; no reaction is involved.

d) KMnO4 is an unstable compound and decomposes in presence of FeSO4 to a colourless compound.

1. Which among the following is(are) double displacement reaction(s) ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Pb + CuCl2 → PbCl2 + Cu | | (ii) Na2SO4 + BaCl2 → BaSO4 + 2 NaCl | |
| (iii) C + O2 → CO2 | | (iv) CH4 + 2 O2 → CO2 + 2 H2O | |
| a) (i) & (iv) | b) (ii) only | c) (i) & (ii) | d) (iii) & (iv) |

CHEMICAL REACTIONS & EQUATIONS Page No. 4

1. Which among the following statement(s) is(are) true? Expose of silver chloride to sunlight for a long duration turns grey due to

(i) the formation of silver by decomposition of silver chloride

(ii) sublimation of silver chloride

(iii) decomposition of chlorine gas from silver chloride

(iv) oxidation of silver chloride

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) only | b) (i) & (iii) | c) (ii) & (iii) | d) (iv) only |

1. Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is(are) true about slaking of lime and the solution formed ?

(i) It is an endothermic reaction

(ii) It is an exothermic reaction

(iii) The pH of the resulting solution will be more than 7

(iv) The pH of the resulting solution will be less than 7

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) & (ii) | b) (ii) & (iii) | c) (i) & (iv) | d) (iii) & (iv) |

1. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Displacement reaction | | (ii) Precipitation reaction | |
| (iii) Combination reaction | | (iv) Double displacement reaction | |
| a) (i) only | b) (ii) only | c) (iv) only | d) (ii) & (iv) |

1. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 : 1 | b) 2 : 1 | c) 4 : 1 | d) 1 : 2 |

1. Which of the following is(are) an endothermic process(es)?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Dilution of sulphuric acid | | (ii) Sublimation of dry ice | |
| (iii) Condensation of water vapours | | (iv) Evaporation of water | |
| a) (i) & (iii) | b) (ii) only | c) (iii) only | d) (ii) & (iv) |

1. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate ?

|  |  |
| --- | --- |
| a) Lead sulphate (insoluble) | b) Lead acetate |
| c) Ammonium nitrate | d) Potassium sulphate |

1. The following reaction is used for the preparation of oxygen gas in the laboratory

2 KClO3 (s) 2 KCl (s) + 3 O2 (g)

Which of the following statement(s) is (are) correct about the reaction ?

a) It is a decomposition reaction and endothermic in nature.

b) It is a combination reaction

c) It is a decomposition reaction and accompanied by release of heat

d) It is a photochemical decomposition reaction and exothermic in nature

CHEMICAL REACTIONS & EQUATIONS Page No. 5

1. Which one of the following processes involves chemical reaction ?

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

b) Liquefaction of air

c) Keeping petrol in a china dish in the open

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

1. In which of the following chemical equation, the abbreviations represent the correct states of the reactants and products involved at reaction temperature ?

|  |  |
| --- | --- |
| a) 2 H2 (l) + O2 (l) → 2 H2O (g) | b) 2 H2 (g) + O2 (l) → 2 H2O (l) |
| c) 2 H2 (g) + O2 (g) → 2 H2O (l) | d) 2 H2 (g) + O2 (g) → 2 H2O (g) |

1. Which of the following gases can be used for storage of fresh sample of an oil for a long time ?

|  |  |
| --- | --- |
| a) Carbon dioxide or oxygen | b) Nitrogen or oxygen |
| c) Carbon dioxide or helium | d) Helium or nitrogen |

1. Which of the following are combination reactions ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) 2 KClO3 2 KCl + 3 O2 | | (ii) MgO + H2O → Mg(OH)2 | |
| (iii) 4 Al + 3 O2  → 2 Al2O3 | | (iv) Zn + FeSO4 → ZnSO4 + Fe | |
| a) (i) & (iii) | b) (iii) & (iv) | c) (ii) & (iv) | d) (ii) & (iii) |

**Answers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. d | 2. c | 3. c | 4. a | 5. c | 6. a |
| 7. b | 8. a | 9. b | 10. d | 11. b | 12. d |
| 13. b | 14. a | 15. d | 16. d | 17. d | 18. d |

CHEMICAL REACTIONS & EQUATIONS Page No. 6

**Assignment – III**

1. Which of the following does not involve a chemical change ?

a) Leaving milk at room temperature during summer.

b) Leaving an iron nail left exposed to humid atmosphere

c) Respiration

d) Evaporation of water

1. Which of the following observation/s can be used to determine whether a chemical reaction has taken place ?

|  |  |
| --- | --- |
| a) Change in colour | b) Change in temperature |
| c) Evolution of a gas | d) any one of the three |

1. Which of the following does not represent the balanced chemical reaction correctly ?

|  |  |
| --- | --- |
| a) Na (s) H2O (l) → NaOH (aq) + H2 (g) | b) BaCl2 (aq) + Na2SO4 (aq) → BaSO4 (aq) + 2 NaCl (aq) |
| c) H2 (g) + Cl2 (g) → 2 HCl (g) | d) CaO (s) + H2O (l) → Ca(OH)2 (aq) |

1. On white washing the walls of a room, after drying, they give shinning white look. This is due to the formation of

|  |  |  |  |
| --- | --- | --- | --- |
| a) CaCl2 | b) Ca(OH)2 | c) CaCO3 | d) CaO |

1. Which of the following is not a combination reaction ?

|  |  |
| --- | --- |
| a) CaO (s) + H2O (l) → Ca(OH)2 (aq) | b) C (s) + O2 (g) → CO2 (g) |
| c) CH4 (g) + 2 O2 (g) → CO2 (g) + 2 H2O (l) | d) 2 H2 (g) + O2 (g) → 2 H2O (l) |

1. The reaction in which heat is evolved are called

|  |  |
| --- | --- |
| a) thermal reactions | b) exothermic reactions |
| c) endothermic reactions | d) photochemical reactions |

1. Which of the following reaction is an endothermic reaction ?

a) Burning of coal

b) Decomposition of vegetable matter into compost

c) Process of respiration

d) Decomposition of calcium carbonate to form quick lime and carbon dioxide

1. When crystals of ferrous sulphate are heated, they decompose to form

|  |  |
| --- | --- |
| a) FeO (s) and SO2 (g) | b) FeO (s) and SO3 (g) |
| c) Fe2O3 (s) , SO2 (g) and SO3 (s) | d) Fe2O3 (s) , SO2 (g) and SO3 (g) |

1. When crystals of lead nitrate are heated, they decompose to form

|  |  |
| --- | --- |
| a) Pb (s) and NO2 (g) | b) PbO (s) , NO2 (g) and O2 (g) |
| c) Pb (s) , NO2 (g) and O2 (g) | d) PbO (s) , NO (g) and NO2 (g) |

1. Which of the following is not a necessary condition for a decomposition reaction ?

|  |  |
| --- | --- |
| a) There is only one reactant | b) There are two or more than two products |
| c) Heating is always required | d) All the above conditions are necessary |

1. Which of the following is not a thermal decomposition reaction ?

|  |  |
| --- | --- |
| a) CaCO3 (s) → CaO (s) + CO2 (g) | b) 2 AgCl (s) → 2 Ag (s) + Cl2 (g) |
| c) 2 KClO3 (s) → 2 KCl (s) + 3 O2 (g) | d) 2 NaHCO3 (s) → Na2CO3 (s) + CO2 (g) + H2O (l) |

CHEMICAL REACTIONS & EQUATIONS Page No. 7

1. The following examples of decomposition reactions represent respectively

2 AgBr (s) → 2 Ag (s) + Br2 (g) ; 2 H2O (l) → 2 H2 (g) + O2 (g)

a) thermal decomposition , electrolytic decomposition

b) thermal decomposition , thermal decomposition

c) photodecomposition , electrolytic decomposition

d) photodecomposition , thermal decomposition

1. On electrolytic decomposition of water, the ratio of H2 and O2 gases collected is

|  |  |
| --- | --- |
| a) 1 : 1 | b) 1 : 2 |
| c) 2 : 1 | d) depends on amount of H2O taken |

1. Which of the following displacement reaction will not take place ?

|  |  |
| --- | --- |
| a) Cu (s) + FeSO4 (aq) → CuSO4 (aq) + Fe (s) | b) Zn (s) + FeSO4 (aq) → ZnSO4 (aq) + Fe (s) |
| c) Cu (s) + 2 AgNO3 (aq) → Cu(NO3)2 (aq) + 2 Ag (s) | d) Fe (s) + CuSO4 (aq) → FeSO4 (aq) + Cu (s) |

1. Which one of the following is an example of a double displacement reaction as well as precipitation reaction ? Given that reactants are taken in aqueous solution

|  |  |
| --- | --- |
| a) NaOH + HCl → NaCl + H2O | b) FeS + H2SO4 → FeSO4 + H2S |
| c) BaCl2 + Na2SO4 → BaSO4 + 2 NaCl | d) 2 NaOH + H2SO4 → Na2SO4 + 2 H2O |

1. Calcium oxide reacts vigorously with water to produced slaked lime

Cao (s) + H2O (l) → Ca(OH)2 (aq)

This reaction can be classified as

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Combination reaction | (ii) Exothermic reaction | (iii) Endothermic reaction | (iv) Oxidation reaction |
| a) (i) & (iii) | b) (iii) & (iv) | c) (i) , (iii) & (iv) | d) (i) & (ii) |

1. 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) Combination reaction | b) Displacement reaction |
| c) Decomposition reaction | d) Double displacement reaction |

1. In a double displacement reaction such as reaction between sodium sulphate solution and barium chloride solution. Choose correct options from the following

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Exchange of atoms takes place | | (ii) Exchange of ions takes place | |
| (iii) a precipitate is produced | | (iv) an insoluble salt is produced | |
| a) (ii) & (iv) | b) (i) & (iii) | c) (ii) only | d) (ii) , (iii) & (iv) |

1. Which one of the following statements is not correct ?

a) Oxidation involves gain of oxygen or loss of hydrogen

b) Reduction involves lose of oxygen or gain of hydrogen

c) Oxidising agent is a substance which can lose hydrogen

d) Reducing agent is a substance which can gain oxygen

CHEMICAL REACTIONS & EQUATIONS Page No. 8

1. The chemical formula of rust is

|  |  |  |  |
| --- | --- | --- | --- |
| a) FeO.Fe2O3 | b) Fe2O3.xH2O | c) FeO.xH2O | d) Any one of these |

1. Rancidity involves

|  |  |
| --- | --- |
| a) Oxidation of food | b) Reduction of food |
| c) Oxidation or reduction of food | d) Fermentation of food |

**Answers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. d | 2. d | 3. a | 4. c | 5. c | 6. b | 7. d |
| 8. d | 9. b | 10. c | 11. b | 12. c | 13. c | 14. a |
| 15. c | 16. d | 17. d | 18. d | 19. c | 20. b | 21. a |

CHEMICAL REACTIONS & EQUATIONS Page No. 9

**Paragraph Based Questions**

**Question numbers 1 to 5 are based on the following paragraph.**

**Paragraph 1 :** In order to study the relative activity of metals, four metals, namely, Cu, Ag, Al and Fe and their salts namely, CuSO4 , AgNO3 , Al2(SO4)3 and FeSO4 were taken. The salts were dissolved in water separately in four beakers. Small amounts of these solutions were taken in four test tubes and a strip of copper was dipped in each of these four test tubes. Same was repeated for Ag in another set of four test tubes, and likewise with Al and Fe strips.

1. Which one of the following reaction will take place ?

|  |  |
| --- | --- |
| a) Ag in CuSO4 solution | b) Cu in FeSO4 solution |
| c) Fe in Al2(SO4)3 solution | d) Fe in CuSO4 solution |

1. For the reaction chosen in Q.2, what will be the colour of the solution ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Blue | b) light green | c) Colourless | d) Pale yellow |

1. On the basis of your study, what will be the correct order of activity of metals ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Ag > Cu > Fe > Al | b) Al > Fe > Cu > Ag | c) Al > Cu > Fe > Ag | d) Cu > Fe > Al > Ag |

1. What type of reaction is involved in the reaction chosen above ?

|  |  |
| --- | --- |
| a) Displacement reaction | b) Double displacement reaction |
| c) Precipitation reaction | d) Decomposition reaction |

1. When copper strip is dipped in silver nitrate solution which of the following is/are correct ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) Colour of silver nitrate solutions turns blue | | (ii) It is a redox reaction | |
| (iii) It is double displacement reaction | | (iv) No reaction will take place | |
| a) (i) & (ii) | b) (i) , (ii) & (iii) | c) (ii) , (iii) & (iv) | d) (i) & (iii) |

**Question numbers 6 to 10 are based on the following paragraph.**

**Paragraph 2 :** Balancing of a chemical equation means making the atoms of each element equal on the two side of the equation. This is because law of conservation of mass must hold good. Further, to make the balanced equation fully informative, conditions like the state of each reactant and product, heat change, temperature, etc. must also be indicated. The most important use of a balanced chemical equation is that it helps in the quantitative calculations, called stoichiometry.

1. Which of the following represents a balanced chemical equation correctly ?

|  |  |
| --- | --- |
| a) Mg3N2 + 6 H2O → 3 Mg(OH)2 + N2 + 5 H2 | b) Na2CO3 + 2 HCl → Na2Cl2 + H2O + CO2 |
| c) Zn + H2SO4 → ZnSO4 + 2 H2 | d) 2 KClO3 2 KCl + 3 O2 |

1. When steam is passed over heated iron, the products formed are magnetic oxide of iron and hydrogen gas. The coefficients of Fe and H2O in the balanced equation are respectively.

|  |  |  |  |
| --- | --- | --- | --- |
| a) 4 , 3 | b) 3 , 4 | c) 2 , 3 | d) 1 , 1 |

CHEMICAL REACTIONS & EQUATIONS Page No. 10

1. Which of the following represents an endothermic reaction ?

|  |  |
| --- | --- |
| a) N2 + O2 → 2 NO | b) Respiration |
| c) Burning of coke | d) N2 + 3 H2 → 2 NH3 |

1. In the preparation of O2 gas by heating potassium chlorate (KClO3) the catalyst used is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Fe2O3 | b) MnO2 | c) Ni | d) Fe |

1. Which one of the following statement/s is/are correct ?

(i) When CO2 is passed through lime water, it first turns milky and then becomes colourless.

(ii) There is no action of water on magnesium nitride (Mg3N2)

(iii) When Cl2 is passed through KBr solution, the solution acquires light brown colour

(iv) When dilute sulphuric acid is poured over FeS crystals, a pungent smelling gas is produced

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) , (ii) & (iii) | b) (i) , (iii) & (iv) | c) (ii) , (iii) & (iv) | d) (i) , (ii) , (iii) & (iv) |

**Question numbers 11 to 15 are based on the following paragraph.**

**Paragraph 3 :** Every chemical reaction involves a chemical change, yet every reaction may not involve the same type of change. Due to this reason, the reactions have been classified into different types like decomposition reactions, combination reactions, displacements reactions, etc. Further, it is not fixed that a particular reactions will be classified as one type only, it may simultaneously be involving one type of change as well as the other type of change.

1. When CuSO4.5H2O crystals are strongly heated, the end products are :

|  |  |
| --- | --- |
| a) CuSO4 and H2O | b) CuO , SO2 |
| c) CuO , SO2 , O2 | d) CuO , SO2 , SO3 and O2 |

1. Which of the following is not a photodecomposition reaction ?

|  |  |
| --- | --- |
| a) NaCl → 2Na + Cl2 | b) 2 AgBr → 2 Ag + Br2 |
| c) 2 HI → H2 + I2 | d) 2 H2O2 → 2 H2O + O2 |

1. Which of the following is a double displacement reaction as well as precipitation reaction ?

|  |  |
| --- | --- |
| a) 2 NaOH + H2SO4 → Na2SO4 + 2 H2O | b) Zn + CuSO4 → ZnSO4 + Cu |
| c) BaCl2 + H2SO4 → BaSO4 + 2 HCl | d) Pb + CuCl2 → PbCl2 + Cu |

1. Oxidation reaction involves

|  |  |  |  |
| --- | --- | --- | --- |
| a) gain of oxygen | b) lose of hydrogen | c) lose of electrons | d) Any one of these |

1. Which of the following are combination reactions ?

|  |  |  |  |
| --- | --- | --- | --- |
| (i) CaCO3 → CaO + CO2 | | (ii) CaO + H2O → Ca(OH)2 | |
| (iii) Fe + CuSO4 → FeSO4 + Cu | | (iv) 2 NO + O2 → 2 NO2 | |
| a) (i) & (ii) | b) (ii) & (iii) | c) (ii) & (iv) | d) (ii) , (iii) & (iv) |

CHEMICAL REACTIONS & EQUATIONS Page No. 11

**Question numbers 16 to 20 are based on the following paragraph.**

**Paragraph 4 :** ‘Oxidation’ and ‘Reduction’ reactions, collectively called ‘Redox Reactions’ is an important category of reactions which we come across in the laboratory as well as in our everyday life. Burning of coal is oxidation while isolating metals from their salts is reduction. Both oxidation and reduction go hand in hand because if one substance is oxidised, the other is reduced. The substance which helps in bringing about oxidation is called oxidising agent and the one which helps in reduction is called reducing agent.

1. In the reaction CuO + H2 → Cu + H2O, the substance that acts an oxidising agent is

|  |  |  |  |
| --- | --- | --- | --- |
| a) CuO | b) H2 | c) Cu | d) H2O |

1. In the reaction ZnO + C → Zn + CO, the substance that acts as a reducing agent is

|  |  |  |  |
| --- | --- | --- | --- |
| a) ZnO | b) C | c) Zn | d) CO |

1. In the reaction 2 H­2S + SO2 → 3 S + 2 H­2O, the substance oxidized and reduced respectively are

|  |  |  |  |
| --- | --- | --- | --- |
| a) H2S and SO2 | b) SO2 and H2S | c) SO2 and S | d) H2S and S |

1. In the reaction Zn + CuSO4 → ZnSO4 + Cu, the substance oxidized and reduced respectively are

|  |  |  |  |
| --- | --- | --- | --- |
| a) Zn and Cu | b) Cu and Zn | c) Zn , Cu2+ | d) Cu2+ , Zn |

1. Which of the following statement/s correctly represent/s an oxidising agent

(i) A substance that gain oxygen acts as an oxidising agent

(ii) A substance which undergo reduction acts as an oxidising agent

(iii) A substance that lose hydrogen acts as an oxidising agent

(iv) A substance that gain electrons in a reaction acts as an oxidising agent

|  |  |  |  |
| --- | --- | --- | --- |
| a) (i) & (ii) | b) (ii) & (iii) | c) (ii) & (iv) | d) (i) & (iv) |

**Answers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. d | 2. b | 3. b | 4. a | 5. a | 6. d | 7. b |
| 8. a | 9. b | 10. b | 11. d | 12. a | 13. c | 14. d |
| 15. c | 16. a | 17. b | 18. a | 19. c | 20. c |  |

CHEMICAL REACTIONS & EQUATIONS Page No. 12

**Karan Arora** **M: 9416974837**

**Fill in the Blanks**

1. Respiration is a ………………….. change.
2. When lead nitrate solution is mixed with potassium iodide solution the yellow solid formed is of ………………. .
3. When zinc reacts with hydrochloric acid, the gas evolved is ……………………….
4. The reaction which involve absorption of heat are called …………………………. Reactions.
5. The magnetic oxide of iron has the formula ……………….. .
6. Respiration involves the oxidation of ……………………. In the body.
7. Dissolution of copper sulphate crystals (CuSO4.5H2O) involves ………………….. of heat.
8. Reaction which take place in presence of light are called …………………………. reactions.
9. Magnesium burns in air to form magnesium oxide. This type of reaction is called …………………….. reaction.
10. Lead nitrate on heating leaves behind yellow lead oxide. This type of reaction is called ………………………
11. When water is decomposed electrolytically, H2 and O2 gas obtained are in the ratio ……………………… .
12. When AgBr is kept in sunlight for long time, the residue left behind is that of …………………….. .
13. In reactivity series, copper lies ………………………. Hydrogen.
14. When iron nails are kept immersed in copper sulphate solution, the blue colour changes to …………………. Colour.
15. To the reaction between AgNO3 solution with NaCl solution, two names of this type of reactions are …………………….. and ……………………. .
16. A reaction between an acid and a base is called ………………………… reaction.
17. When H2 gas is passed over heated copper (II) oxide, the residue left behind is that of …………………… .
18. In the reaction H2S + Cl2 → 2 HCl + S, the oxidising agent is ………………….. .
19. The chemical formula of rust is ……………………….. .
20. The oxidation of oils and fats resulting into bad smell and bad taste is called ……………………..

**Answers**

1. chemical 2. Lead iodide (PbI2) 3. H2 gas 4. Endothermic 5. Fe3O4 6. glucose

7. Absorption 8. Photochemical 9. Combination 10. Decomposition 11. 2 : 1

12. silver (Ag) 13. Below 14. Light green 15. Double displacement, precipitation

16. neutralisation 17. Copper (Cu) 18. Cl2 19. Fe2O3.xH2O 20. Rancidity

CHEMICAL REACTIONS & EQUATIONS Page No. 13

**Karan Arora** **M: 9416974837**

**True/False**

1. Burning of candle wax is a physical change.
2. Hydrogen gas is a combustible gas.
3. A chemical reaction is always accompanied by rise in temperature.
4. The reaction between heated iron and steam in a closed vessel is a reversible reaction.
5. Dissolution of anhydrous CuSO4 is an exothermic process.
6. Reaction of quick lime with water is a combination reaction.
7. Green FeSO4 crystals on strong heating leave behind a residue of FeO.
8. In our body, proteins decompose to form amino acids.
9. If zinc pieces are added to blue copper sulphate solution, it becomes colourless after sometime.
10. If copper turnings are added to colourless silver nitrate solution, it turns blue after sometime.
11. When BaCl2 and Na2SO4 solutions are mixed, new products are formed but the solution remains colourless.
12. On passing CO2 gas through lime water for long times the lime water turns milky.
13. In the reaction 2 H­2S + SO2 → 3 S + 2 H­2O, SO2 is acting as oxidising agent.
14. Aluminium is highly resistant to corrosion.

**Answers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. False | 2. True | 3. False | 4. True | 5. True | 6. True | 7. False |
| 8. True | 9. True | 10. True | 11. False | 12. False | 13. True | 14. True |

**Matching Type Questions**

1. Column I Column II

(Reactants) (Colour of solid ppt.)

|  |  |
| --- | --- |
| (i) Lead nitrate + potassium iodide | (a) Red |
| (ii) Silver nitrate + Sodium chloride | (b) Yellow |
|  | (c) White |
|  | (d) Blue |

CHEMICAL REACTIONS & EQUATIONS Page No. 14

1. Column I Column II

(Reaction) (Nature of gas evolved)

|  |  |
| --- | --- |
| (i) CaCO3 + HCl acid | (a) Combustible |
| (ii) FeS + HCl acid | (b) Rotten egg like smell |
|  | (c) Turns lime water milky |
|  | (d) Supports combustion |

1. Column I Column II

(Reaction) (Nature of reaction)

|  |  |
| --- | --- |
| (i) Quick lime + water | (a) Endothermic |
| (ii) Ba(OH)2 + NH4Cl | (b) Exothermic |
|  | (c) Neither exothermic nor endothermic |
|  | (d) No reaction takes place |

1. Column I Column II

(Reaction) (Type of reaction)

|  |  |
| --- | --- |
| (i) 2 SO2 + O2 → 2 SO3 | (a) Double displacement reaction |
| (ii) Zn + CuSO4 → ZnSO4 + Cu | (b) Decomposition reaction |
|  | (c) Displacement reaction |
|  | (d) Combination reaction |

1. Column I Column II

(Decomposition Reaction) (Type of Decomposition reaction)

|  |  |
| --- | --- |
| (i) 2 KClO3 → 2 KCl + 3 O2 | (a) Electrolytic |
| (ii) 2 AgCl → 2 Ag + Cl2 | (b) Photochemical |
|  | (c) Thermal |

**Answers**

|  |  |  |
| --- | --- | --- |
| 1. (i) – b , (ii) – c | 2. (i) – c , (ii) – b | 3. (i) – b , (ii) – a |
| 4. (i) – d , (ii) – c | 5. (i) – c , (ii) – b |  |

CHEMICAL REACTIONS & EQUATIONS Page No. 15

**Karan Arora** **M: 9416974837**

**N.C.E.R.T QUESTIONS**

1. Why should a magnesium ribbon be cleaned before burning in air ?
2. A solution of a substance ‘X’ is used for white washing
3. Name the substance ‘X’ and write its formula.
4. Write the reaction of the substance ‘X’ named in (i) above with water.
5. Why is the amount of gas collected in one of the test tube double of the amount collected in the other on electrolysis of water? Name this gas.
6. When you mixed the solutions of lead (II) nitrate and potassium iodide
7. What is the colour of the precipitate formed? Name the compound precipitated.
8. Write the balanced chemical equation for this reaction.
9. Is this also a double displacement reaction ?
10. A magnesium ribbon burns with a dazzling flame in air (oxygen) and changes into a white substance, magnesium oxide. Is magnesium being oxidised or reduced in this reaction ?
11. Why does the copper sulphate change when an iron nail is dipped in it ?
12. Give an example of a double displacement reaction other than the one between barium chloride and sodium sulphate solutions.
13. Identify the substances oxidized and the substance reduced in the following reactions :
14. 4 Na (s) + O2 (g) → 2 Na2O (s)
15. CuO (s) + H2 (g) → Cu (s) + H2O (l)
16. Which of the statements above the reaction below are incorrect ?

2 PbO (s) + C (s) → 2 Pb (g) + CO2 (g)

|  |  |  |  |
| --- | --- | --- | --- |
| a) Lead is getting reduced | | b) Carbon dioxide is getting oxidised | |
| c) Carbon is getting oxidised | | d) Lead oxide is getting reduced | |
| i) a and b | ii) a and c | iii) a, b and c | iv) all |

1. Fe2O3 + 2 Al → Al2O3 + 2 Fe,

The above reaction is an example of

|  |  |
| --- | --- |
| a) Combination reaction | b) Double displacement reaction |
| c) Decomposition reaction | d) Displacement reaction |

1. What happens when dilute hydrochloric acid is added to iron fillings ? Choose the correct answer.

|  |  |
| --- | --- |
| a) Hydrogen gas and iron chloride are produced | b) Chlorine gas and iron hydroxide are produced |
| c) No reaction takes place | d) Iron salt and water are produced |

1. What is balanced chemical equation? Why should the chemical equation be balanced ?
2. What do you mean by exothermic and endothermic reactions? Give examples.
3. Why is respiration considered as an exothermic reaction? Explain.
4. Why are decomposition reactions called opposite of combination reactions ? Write equations for these reactions.

CHEMICAL REACTIONS & EQUATIONS Page No. 16

1. Write one equation each of decomposition reaction where energy is supplied in the form of heat, light or electricity.
2. What is difference between the displacement and double displacement reactions? Write equations for these reactions.
3. In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.
4. What do you mean by precipitation reactions? Explain giving examples.
5. Explain the following in terms of gain or loss of oxygen with two examples each :

a) Oxidation b) Reduction

1. A shiny brown coloured element ‘X’ on heating in air becomes black in colour. Name the element ‘X’ and the black coloured compound formed.
2. Why do we apply paints on iron articles ?
3. Oil and fat containing food items are flushed with nitrogen. Why ?
4. Explain the following terms with example : a) Corrosion b) Rancidity

**Explanation**

1. When magnesium ribbon remains exposed to moist air, a white layer of magnesium oxide is formed on its surface. This hinders the burning of magnesium. Hence, this layer is first removed by rubbing with sand paper before burning.
2. (i) The substance ‘X’ is used for white washing is quicklime (calcium oxide). The formula is CaO.

(ii) When quick lime is mixed with water, the following reaction takes place:

CaO (s) + H2O (l) → Ca(OH)2 (aq)

Quick lime water Calcium hydroxide

(Calcium oxide) (Slaked lime)

The white suspension of slaked lime is applied on the walls. It combines with carbon dioxide of the air forming a thin shinning layer of calcium carbonate.

Ca(OH)2 + CO2 → CaCO3  + H2O

Slaked lime carbon dioxide Calcium carbonate Water

(from air)

1. On electrolysis, water decomposes according to the reaction

2 H2O (l) H2 (g) + O2 (g)

Thus, water decomposes to give hydrogen and oxygen in the ratio of 2 : 1 by volume. The double volume of the gas collected is hydrogen.

1. (i) Colour of the precipitate formed is yellow. The compound formed is Lead iodide (PbI2).

(ii) Pb(NO3)2 (aq) + 2 KI (aq) → PbI2 (s) + 2 KNO3 (aq)

Lead nitrate Potassium iodide Lead iodide Potassium nitrate

(iii) Yes, it is a double displacement reaction.

CHEMICAL REACTIONS & EQUATIONS Page No. 17

1. Magnesium is oxidized to magnesium oxide (because it gains oxygen).
2. Iron is more reactive than copper. It displaces copper from copper sulphate solution according to the following reaction

Fe (s) + CuSO4 (aq) → FeSO4 (aq) + Cu (s)

Iron Copper sulphate Iron(II) sulphate Copper

Thus, as copper sulphate reacts to form Iron(II) sulphate, the blue colour of copper sulphate solution fades.

1. AgNO3 (aq) + NaCl (aq) → AgCl (s) + NaNO3 (aq)

Silver nitrate Sodium chloride Silver chloride Sodium nitrate

1. (i) 4 Na (s) + O2 (g) → 2 Na2O (s) . Here, Na has gained oxygen to form Na2O. Hence, Na has been oxidized to Na2O. Obviously, therefore, O2 has been reduced.

(ii) CuO (s) + H2 (g) → Cu (s) + H2O (l) . Here, Cu has lost oxygen to form Cu. Hence, CuO has been reduced to Cu. H2 has gained oxygen to form H2O. Hence, H2 has been Oxidized to H2O.

1. Statements a and b are incorrect. Hence (i) is the correct option.
2. The given equation is a displacement reaction in which Fe of Fe2O3 has been displaced by Al. Hence, (d) is the correct option.
3. The following reaction takes place :

Fe + 2 HCl → FeCl2 + H2O

Iron Hydrochloric acid Iron chloride Water

Thus, hydrogen and iron chloride are produced. Therefore (a) is the correct option.

1. **Balanced chemical equation** : An equation in which the number of atoms of each element on the two sides of the equation is equal is called a balanced chemical equation.

**Why should chemical equation be balanced ?** : According to law of conservation of mass, the total mass of products must be equal to total mass of reactants. This is possible only if the number of atoms of each element is same on the two side of the equation.

1. **1. Exothermic reactions** : Those reactions in which heat is evolved during the reaction are called exothermic reactions. Examples :
2. **Burning of coke.**

C (s) + O2 (g) → CO2 (g) + Heat

Coke Oxygen Carbon dioxide

(from air)

1. **Burning of natural gas (methane)**

CH4 (g) + 2 O2 (g) → CO2 (g) + 2 H2O (l) + Heat

Methane Oxygen Carbon dioxide Water

(from air)

1. **Oxidation of glucose in the cells of our body**

C6H12O6 (s) + 6 O2 (g) → 6 CO2 (g) + 6 H2O (l) + Heat

Glucose Oxygen Carbon dioxide Water

CHEMICAL REACTIONS & EQUATIONS Page No. 18

**2. Endothermic reactions** : Those reactions in which heat is absorbed during the reaction are called endothermic reactions. Examples :

1. **Reaction of coke with steam**

C (s) + H2O (g) + Heat → CO (g) + H2 (g)

Coke steam Carbon monoxide Hydrogen

1. **Combination of nitrogen and oxygen to form nitric oxide**

N2 (g) + O2 (g) + Heat → 2 NO (g)

Nitrogen Oxygen Nitric oxide

1. **Decomposition of mercuric oxide**

2 HgO (s) + Heat → 2 Hg (l) + O2 (g)

Mercuric oxide Mercury Oxygen

1. Rice, potatoes, bread etc. that we eat contain starch. On digestion, it breaks down into glucose. The air we breathe in during respiration oxidizes glucose into carbon dioxide and water with the liberation of heat which provides our body with the required energy. Hence, respiration is considered as an exothermic reaction.
2. In a decomposition reaction, a single compound splits to give two or more simpler substances whereas in a combination reaction, two or more simpler substances combine together to form a single compound. Hence, they are opposite to each other.

**Examples of decomposition reactions :**

1. CaCO3 (s) CaO (s) + CO2 (g)

Calcium carbonate Calcium oxide Carbon dioxide

(Lime stone) (Quick lime)

1. 2 Pb(NO3)2 (s) 2 PbO (s) + 4 NO2 (g) + O2 (g)

Lead nitrate Lead oxide Nitrogen dioxide Oxygen

1. 2 FeSO4 (s) Fe2O3 (s) + SO2 (g) + SO3 (g)

Ferrous sulphate Ferric oxide Sulphur dioxide Sulphur trioxide

**Examples of combination reactions :**

1. 2 Mg (s) + O2 (g) 2 MgO (s)

Magnesium Oxygen Magnesium oxide

1. CaO (s) + H2O (l) Ca(OH)2 (aq)

Quick lime Water Slaked lime

1. 2 H2 (g) + O2 (g) 2 H2O (l)

Hydrogen Oxygen Water

CHEMICAL REACTIONS & EQUATIONS Page No. 19

1. Decomposition reaction involving absorption of heat

CaCO3 (s) CaO (s) + CO2 (g)

Lime stone Quick lime Carbon dioxide

Decomposition reaction involving absorption of light

2 AgCl (s) 2 Ag (s) + Cl2 (g) or 2 H2O2 2 H2O + O2

Silver chloride Silver Chlorine Hydrogen peroxide Water Oxygen

Decomposition reaction involving absorption of electrical energy

2 H2O (l) 2 H2 (g) + O2 (g)

Water Hydrogen Oxygen

1. **Displacement reaction** means single displacement reaction where more active element displaces a less reactive element from the solution of its salt. For examples
2. Zn (s) + CuSO4 (aq) ZnSO4 (aq) + Cu (s)

Zinc Copper sulphate Zinc sulphate Copper

1. Cl2 (g) + 2 KI (aq) 2 KCl (aq) + I2 (aq)

Chlorine Potassium iodide Potassium chloride Iodine

In reaction (i), zinc has displaced copper from CuSO4..

In reaction (ii), chlorine has displaced iodine from KI.

**Double displacement reactions** are those reactions in which the solutions of two ionic compounds react in such a way that both the anions are exchanged. For examples

1. BaCl2 (aq) + Na2SO4 (aq) BaSO4 (s) + 2 NaCl (aq)

Barium chloride Sodium sulphate Barium sulphate Sodium chloride

1. AgNO3 (aq) + NaCl (aq) AgCl (s) + NaNO3 (aq)

Silver nitrate Sodium chloride Silver chloride Sodium nitrate

In reaction (i), chloride ions of BaCl2 are replaced by sulphate ions of Na2SO4 and sulphate ions of Na2SO4 are replaced by chloride ions of BaCl2. Similarly, in reaction (ii), nitrate ions () and chloride ions (Cl – ) are exchanged.

1. Cu (s) + 2 AgNO3 (aq) Cu(NO3)2 (aq) + 2 Ag (s)

Copper Silver nitrate Copper (II) nitrate Silver

1. When on mixing the clear solutions of two ionic compounds, an insoluble solid is formed that separates out, the solid formed is called a precipitation reaction. For example
2. BaCl2 (aq) + Na2SO4 (aq) BaSO4 (s) + 2 NaCl (aq)

Barium chloride Sodium sulphate Barium sulphate Sodium chloride

1. AgNO3 (aq) + NaCl (aq) AgCl (s) + NaNO3 (aq)

Silver nitrate Sodium chloride Silver chloride Sodium nitrate

CHEMICAL REACTIONS & EQUATIONS Page No. 20

1. **Oxidation :** It is defined as a process which involves gain of oxygen. For examples,
2. 2 Mg (s) + O2 (g) 2 MgO (s)

Magnesium Oxygen Magnesium oxide

Here, Mg gained oxygen to form MgO. Hence, Mg has been oxidized to MgO.

1. CuO (s) + H2 (g) Cu (s) + H2O(g)

Copper oxide Hydrogen Copper Water

Here, H2 has gained oxygen to form H2O. Hence, H2 has been oxidized to H2O

**Reduction :** It is defined as a process which involves lose of oxygen. For examples,

1. ZnO (s) + C (s) Zn (s) + CO (g)

Zinc oxide Carbon Zinc Carbon monoxide

Here, ZnO has lost oxygen to form Zn. Hence, ZnO has been reduced to Zn.

1. Fe2O3 (s) + Al (s) 2 Fe (s) + Al2O3 (g)

Ferric oxide Aluminium Iron Aluminium oxide

Here, Fe2O3 has lost oxygen to form Fe. Hence, Fe2O3 has been reduced to Fe.

1. The element ‘X’ must be copper because copper is a shiny brown coloured element which on heating in air combines with oxygen of the air to form black copper oxide.

2 Cu (s) + O2 (g) 2 CuO (s)

Copper Oxygen Copper (II) oxide

(from air) (Black)

Thus, black coloured compound formed is Copper (II) oxide, CuO.

1. Paints covers the surface of the iron articles. Hence, moist air cannot come directly in contact with iron. As a result, it cannot attack iron and prevents rusting.
2. In the presence of oxygen of the air, the fats present in the fatty food are oxidized to compounds which have a bad smell, i.e., the food becomes rancid. Flushing with nitrogen cuts off oxygen and protects the food from rancidity.
3. **Corrosion :** The process of slowly eating up of the metals due to attack of atmospheric gases such as oxygen, carbon dioxide, hydrogen sulphide, water vapour etc. on the surface of the metals so as to convert the metal into oxide, carbonate, sulphide etc. is known as corrosion.

Examples :

1. **Rusting of iron :**

2 Fe (s) + 3/2 O2 (g) + xH2O (l) Fe2O3.xH2O (s)

Iron Oxygen Moisture Hydrated ferric oxide

(from moist air) (Rust)

CHEMICAL REACTIONS & EQUATIONS Page No. 21

1. 2 Cu (s) + CO2 (g) + O2 (g) + H2O (l) CuCO3 . Cu(OH)2

Iron (from moist air) Basic copper carbonate

(green)

1. 2 Ag (s) + H2S (g) Ag2S (s) + H2 (g)

Silver Hydrogen sulphide Silver sulphide

(from air) (Black)

**Rancidity :** The oxidation of oils fats in a food resulting into a bad smell and bad taste is called rancidity. For Example : When a chips pack is exposed to atmospheric air which results in a change in taste and odour.

**Assertion-Reason Type Questions**

**DIRECTIONS :** In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the correct answer as:

1. If both assertion and reason are true and reason is the true explanation of the assertion.
2. If both assertion and reason are true, but reason is not the true explanation of the assertion.
3. If assertion is true, but reason is false.
4. If assertion is false, but reason is true.
5. **Assertion:** Ferrous sulphate crystals are green in colour but on heating, they first turn white and on further heating decompose to leave behind a reddish brown residue.

**Reason:** They turn white due to loss of water of crystallisation and the reddish brown residue is due to formation of Fe2O3.

1. **Assertion:** When copper powder is heated in air, it turns black.

**Reason:** Copper reacts with H2S gas of the air forming black CuS.

1. **Assertion:** After white washing the walls, a shiny white finish on walls is obtained after 2 to 3 days.

**Reason:** Calcium oxide reacts with carbon dioxide to form calcium hydrogen carbonate which gives shiny white finish.

1. **Assertion:** The following chemical equation , 2 C6H6  + 7/2 O2 4 CO2  + 3 H2O. is a balanced chemical equation

**Reason:** In a balanced chemical equation, the total number of atoms of each element is equal on both side of the equation.

CHEMICAL REACTIONS & EQUATIONS Page No. 22

1. **Assertion:**  CaCO3 (s) CaO (s) + CO2 (g)

**Reason:** Photochemical decomposition occurs in the presence of sunlight.

1. **Assertion:** Quick lime reacts vigorously with water releasing a large amount of heat.

**Reason:** The above chemical reaction is an exothermic reaction.

1. **Assertion:** Photosynthesis is considered as an endothermic reaction.

**Reason:** Energy gets released in the process of photosynthesis.

1. **Assertion:** Fe2O3  + 2 Al Al2O3  + 2 Fe, The above chemical equation is an example of displacement reaction.

**Reason:** Aluminium being more reactive than iron, displaces Fe from its oxide.

1. **Assertion:** Reaction between silver nitrate and potassium chloride is a precipitation reaction.

**Reason:** Precipitation reaction produce insoluble salt.

1. **Assertion:** In the following chemical equation, CuO (s) + Zn (s) ZnO (s) + Cu(s) , Zinc is getting oxidised and copper oxide is getting reduced.

**Reason:** The process in which oxygen is added to a substance is called Oxidation whereas the process in which oxygen is removed is called Reduction.

**Answers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. a | 2. c | 3. c | 4. d | 5. b | 6. a | 7. c | 8. a | 9. a | 10. a |

CHEMICAL REACTIONS & EQUATIONS Page No. 23