CBSE Test Paper-01

Chapter 01 Chemical Reactions and Equations

1. Match the following with correct response. **(1)**

(1) Combination reaction	(A) $ZnO + C \rightarrow Zn + CO$
(2) Decomposition reaction	(B) $2H_2O \rightarrow 2H_2 + O_2$
(3) Displacement reaction	(C) $2Mg + O_2 \rightarrow 2MgO$
(4) Redox reaction	(D) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

   a. 1-D, 2-A, 3-C, 4-B
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-B, 2-D, 3-A, 4-C
   d. 1-A, 2-C, 3-B, 4-D

2. The chemical formula of lead sulphate is **(1)**

   a. Pb2SO4
   b. PbSO4
   c. Pb2(SO4)3
   d. Pb(SO4)2

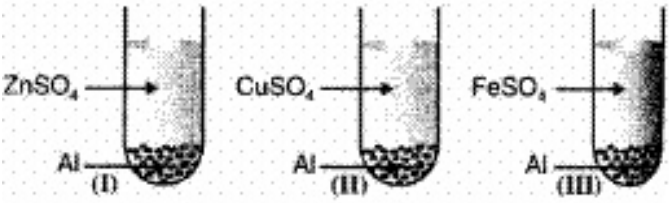
3. The colour of zinc metal is **(1)**

   a. Red dish brown
   b. silvery
   c. white
   d. Grey

4. When you place an iron nail in copper sulphate solution, the reddish brown coating formed on the nail is **(1)**

   a. smooth and shiny
   b. rough and granule
   c. soft and dull

d. hard and flaky

5. 

Observation	I	II	III
Solution after reaction	Colourless	Colourless	Colourless
Metal Deposited	Zn	Cu	Fe

Which of the following is correct conclusion? **(1)**

a. Al is more reactive than Cu and Fe but less reactive than Zn
b. Al is more reactive than Cu but less reactive than Zn and Fe
c. Al is more reactive than Zn and Cu but less reactive than Fe
d. Al is more reactive than Zn, Cu, Fe

6. Oil and fat containing food items are flushed with nitrogen. Why? **(1)**
7. What happens when copper powder is heated ? **(1)**
8. What is the principle of balancing of chemical equation? **(1)**
9. Why are food items packed in aluminium foils? **(1)**
10. Predict whether gold can displace copper from copper sulphate solution. **(3)**
11. What does one mean by exothermic and endothermic reactions ? Give examples. **(3)**
12. What are double displacement reaction? **(3)**
13. In the reaction PbS (s) + $4H_2O_2$(aq) → $PbSO_4$(s) + $4H_2O$ (*l*), which is oxidizing agent and which is reducing agent? **(3)**
14. Write the formula and then balance the following equations. **(5)**

a. Butane (C_4H_{10}) + Oxygen $\rightarrow$ Carbon dioxide + Water
b. Magnesium + Silver nitrate $\rightarrow$ Magnesium nitrate + Silver
c. Lime water + Carbon dioxide $\rightarrow$ Calcium carbonate + Water
d. Sodium + Water $\rightarrow$ Sodium hydroxide + Hydrogen
e. Calcium carbonate + Water + Carbon dioxide $\rightarrow$ Calcium bicarbonate

15. There are different types of chemical reactions occurring around us or being carried out for the benefit of mankind, e.g. combination reactions, decomposition reactions, displacement reactions, precipitation reactions, reduction-oxidation (redox) reactions, photochemical reactions etc.
Now answer the following questions: **(5)**

i. Combustion of coke is a combination reaction. CO_2 is not a pollutant. Then why is combustion of coke harmful?
ii. Which reaction followed by two combination reactions are involved in white wash of walls?
iii. Give one use of tin plating in daily life.
iv. How photochemical reactions have played an important role in photography?

CBSE Test Paper-01

Chapter 01 Chemical Reactions and Equations

Answers

1. b. 1-C, 2-B, 3-D, 4-A

   Explanation: 2 or more joining together to form single product is combination

   Breaking of single reactant into 2 or more is decomposition

   Both oxidation and reduction occurring simultaneously is redox reaction

   More reactive metal displacing less reactive metal from its salt displacement reaction

2. b. $PbSO_4$

   Explanation: $PbSO_4$

3. d. Grey

   Explanation: It is whitish or bluish grey in colour.

4. c. soft and dull

   Explanation: When you dip an iron nail in $CuSO_4$, iron replaces copper from $CuSO_4$, since it is more reactive than copper. The displaced copper gets deposited on the nail, which is soft and dull in nature.

   $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

5. d. Al is more reactive than Zn, Cu, Fe

   Explanation: $2Al + 3ZnSO_4 \rightarrow Al_2(SO_4)_3 + 3\ Zn$

   $2Al + 3CuSO_4 \rightarrow Al_2(SO_4)_3 + 3\ Cu$

   $2Al + 3FeSO_4 \rightarrow Al_2(SO_4)_3 + 3Fe$

   Al is more reactive than Zn, Cu and Fe because it displaces them from their salt solution.

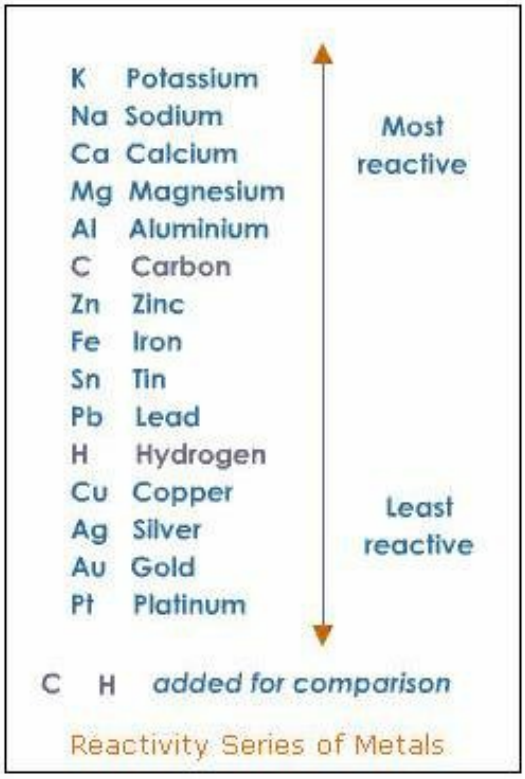
6. In the presence of oxygen in the air, the fats present in the fatty food are oxidised to compounds which have a bad smell i.e. the food becomes rancid. Flushing with nitrogen cuts off the contact of food with oxygen and protects the food from rancidity.

7. Copper is oxidised to copper oxide.It means addition of oxygen.
   Oxygen is reduced to copper oxide. It means addition of metal i.e reduction.
   So, balanced chemical equation is: $2Cu + O_2 \rightarrow 2CuO$
   A black colour copper (II) oxide is formed.

8. Chemical reactions follow the law of conservation of mass, meaning that the total mass of the reactants has to be equal to the total mass of the products. The number of each type of atom must also be conserved from reactants to products. Atoms cannot be created or destroyed, so if the equation cannot be balanced, there must be another reactant or product involved. Uncovering these missing materials can shed light on how the reactions take place, how to get a better yield of the products, or what waste products may be generated.

9. A protective coating of aluminium oxide (Al_2O_3) is formed on the surface of the foil which prevents it from getting corroded in the presence of air and water. Hence, food items are saved from getting spoilt when packed in aluminium foils.

10. Gold lies below copper in the activity series. This means that gold cannot displace copper from copper sulphate solution.



11. **Exothermic reaction:** A chemical reaction in which heat is given out is known as

exothermic reaction. For example

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

$NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l) + \text{Heat energy}$

Endothermic reaction: A chemical reaction in which heat energy is absorbed is known as endothermic reaction. For example

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

$C(s) + H_2O(g) \xrightarrow{Heat} CO(g) + H_2(g)$

12. Reactions in which ions are exchanged between two reactants forming new compounds are called double displacement reactions.

    $AB + CD \rightarrow AC + BD$

    These are the reactions in which two different atoms or groups of atoms are displaced by another atoms/groups of atoms.

    Example :

    i. $BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s)\downarrow + 2NaCl(aq)$

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

    Such reactions usually occur in ionic compound and are very fast reactions.

13. **Oxidation** - involves the loss of electrons or hydrogen OR gain of oxygen OR increase in oxidation state.

    Reduction - involves the gain of electrons or hydrogen OR loss of oxygen OR decrease in oxidation state.

    In the reaction $PbS(s) + 4H_2O_2(aq) \rightarrow PbSO_4(s) + 4H_2O(l)$, Our reactant is PbS, it takes up oxygen from H_2O_2 and changes to $PbSO_4$. It has undergone oxidation, or it has been oxidized.

    H_2O_2 has lost oxygen and has changed to water, H_2O. so it has been reduced.

14. The formula and balanced equations are:

    a. Butane (C_4H_{10}) + Oxygen $\rightarrow$ Carbon dioxide + Water

$2C_4H_{10} + 13O_2 + \rightarrow 8CO_2 + 10H_2O$

b. Magnesium + Silver nitrate $\rightarrow$ Magnesium nitrate + Silver
$Mg + 2AgNO_3 \rightarrow Mg(NO_3)_2 + 2Ag$

c. Lime water + Carbon dioxide $\rightarrow$ Calcium carbonate + Water
$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

d. Sodium + Water $\rightarrow$ Sodium hydroxide + Hydrogen
$2Na + 2H_2O \rightarrow 2NaOH + H_2$

e. Calcium carbonate + Water + Carbon dioxide $\rightarrow$ Calcium bicarbonate
$CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$

15. i. CO_2 is not considered a pollutant up to a certain level. Rather, it helps in maintaining the temperature of the Earth. Combustion of coke is harmful as it increases the concentration of CO_2 in the atmosphere which causes global warming due to the greenhouse effect.

ii. The reaction of calcium with oxygen gives quicklime (CaO) which when mixed with water forms slaked lime $Ca(OH)_2$ **[combination reaction]** and when slaked lime is applied on walls then it reacts with CO_2 of the air to form $CaCO_3$.

$2Ca(s) + O_2(g) \longrightarrow \underset{\text{Quick lime}}{2CaO(s)}$

$CaO(s) + H_2O(l) \longrightarrow \underset{\text{Slaked lime}}{Ca(OH)_2\,(aq)}$

$Ca(OH)_2(aq) + CO_2(g) \longrightarrow \underset{\text{Calcium carbonate}}{CaCO3(s)} + H_2O(l)$

iii. Tin-plating is preferred in the tiffin boxes because tin is non-poisonous and hence, does not contaminate the food kept in them.

iv. A photographic film used in black and white photography is a celluloid film coated with silver chloride. The silver chloride decomposes in the presence of sunlight and its working is totally based on this decomposition reaction giving silver which forms the image on the film.

$$2AgCl(s) \xrightarrow[(Decomposition)]{Sunlight} \underset{Silver\ (grey)}{2Ag(s)} + Cl_2\,(g)$$

CBSE Test Paper-02

Chapter 01 Chemical Reactions and Equations

1. When zinc metal is dipped in copper sulphate solution **(1)**
   a. No reaction takes place
   b. The solution remains blue and copper metal gets deposited
   c. The solution becomes colourless and reddish brown copper metal gets deposited
   d. The solution becomes green and copper metal gets deposited
2. Which gases are given out when Lead nitrate is heated? **(1)**
   a. NO_2, O_2
   b. N_2O_4 , O_2
   c. PbO , O_2
   d. NO , O_3
3. Find the incorrect statement : **(1)**

   (I) Oxygen is highly combustible and hydrogen is supporter of combustion,
   (II) Oxygen and hydrogen both are highly combustible,
   (III) Oxygen and hydrogen both are supporters of combustion,
   (IV) Hydrogen is highly combustible and oxygen is supporter of combustion
   a. I, II and III
   b. I, III and IV
   c. IV, I and II
   d. I, II and IV
4. Which of the following decolourizes a blue solution of copper sulphate? **(1)**
   A. Al
   B. Zn
   C. Fe

   1. (A), (B) and (C)
   2. (B) only
   3. (A) only
   4. (C) only
5. The reaction $H_2 + Cl_2 \rightarrow 2HCl$ represents: **(1)**

a. Decomposition
b. Oxidation
c. Combination
d. Reduction

6. Complete and balance the following chemical reaction.
   $NaOH + \_\_\_\_ \rightarrow Na_2SO_4 + H_2O$ **(1)**

7. Why does the colour of heated copper powder becomes black when air is passed over it? **(1)**

8. Write the formula and then balance the following equation.
   Red lead oxide $\rightarrow$ Lead monoxide + Oxygen **(1)**

9. Define a displacement reaction. **(1)**

10. Two beakers A and B contain Iron (II) sulphate solution. In the beaker A is placed a small piece of copper and in the beaker B is placed a small piece of zinc. It is found that a grey deposit forms on the zinc but not on the copper. What can be concluded from these observations? **(3)**

11. When solutions of silver nitrate and sodium chloride are mixed, white precipitate forms. The ionic equation for the reaction is **(3)**

    $Ag^+(ag) + Cl^- \longrightarrow AgCl(s)$

    i. a. What is the name of the white precipitate?
       b. Is it a soluble or insoluble compound?
    ii. Is the precipitation of silver chloride a redox reaction?

12. Name the method used to balance a chemical equation. **(3)**

13. What is a balanced chemical equation ? Why should chemical equations be balanced ? **(3)**

14. What are the types of combination reactions ? Give example of each type. **(5)**

15. How will you write a chemical equation ? **(5)**

CBSE Test Paper-02

Chapter 01 Chemical Reactions and Equations

Answers

1. c. The solution becomes colourless and reddish brown copper metal gets deposited

   Explanation:

Zn	+	$CuSO_4$	→	Cu	+	$ZnSO_4$
Gray		blue		reddish brown		colourless

   Zinc is more reactive than copper. zinc displace copper from copper sulphate and Copper metal is deposited.

2. a. NO_2 , O_2

   Explanation: A decomposition reaction takes place on heating $Pb(NO_3)_2$ to form PbO, NO_2 and O_2.

   Lead (II) nitrate → Lead (II) oxide + Nitrogen dioxide + Oxygen

   $2\ Pb(NO_3)_2\ (s) \rightarrow 2\ PbO\ (s) + 4\ NO_2\ (g) + O_2\ (g)$

3. a. I, II and III **Explanation:** Only Hydrogen is combustible and Oxygen is a supporter of combustion

4. a. (A), (B) and (C)

   Explanation: All Zn , Al and Fe are above Cu in the reactivity series so they can displace Cu from $CuSO_4$ Solution.

5. c. Combination

   Explanation: Two reactants combine to give one product.

6. $$\begin{array}{ccccccc} 2NaOH & + & H_2SO_4 & \rightarrow & Na_2SO_4 & + & 2H_2O \\ Sodium\ Hydroxide & & hydrogen\ sulfate & & Salt\ cake & & water \end{array}$$

7. When copper powder is heated in the presence of air,a black coating of copper oxide is formed.

$$2Cu(s) + O_2(g) \rightarrow 2CuO(s)$$

8. Red lead oxide $\rightarrow$ Lead monoxide + Oxygen
   $2Pb_3O_4 \xrightarrow{\triangle} 6PbO + O_2$

9. Displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its compound. Both metals and non-metals take part in displacement reactions.
   Example : Reaction of iron nails with copper sulphate solution.
   $Mg(s) + CuSO_4(aq) \rightarrow MgSO_4(aq) + Cu(s)$

10. From these observation we can conclude that zinc is most active metal followed by iron and copper.
    Copper does not react, but zinc reacts with ferrous sulphate solution. Thus, zinc is most reactive, followed by iron and copper.
    $Zn + FeSO_4 + \longrightarrow ZnSO_4 + Fe$
    $Cu + FeSO_4 \longrightarrow$ No reaction

11. In this reaction, cations Ag^+ and Na^+ have exchanged their anions NO_3 and Cl^- and a precipitate of AgCl has been formed. It is an example of double displacement and precipitation reactions.

    i. a. White precipitate formed is AgCl (Silver chloride) .
       b. It is an insoluble compound.
    ii. It is not a redox reaction.

$$\underset{\text{Sodium chloride}}{NaCl(aq)} + \underset{\text{Silver nitrate}}{AgNO_3(aq)} \longrightarrow \underset{\text{Silver chloride}}{AgCl(s)} + \underset{\text{Sodium nitrate}}{NaNO_3(aq)}$$

12. There are two methods of balancing chemical equation:

    1. **Hit and Trail Method:**

       (i)The symbols and formulae of the reactant and products are written as a skeletal equation.
       (ii) Any elementary gas (O2, H_2, N_2 etc.) appearing on either side of the skeletal equation, is written in the atomic state.

(iii)The formula containing the maximum number of atoms is selected to begin the process of balancing. If this method is not convenient, then balancing of the atoms begin with atoms, which appear minimum number of times.
(iv)Atoms of elementary gases are balanced at the last.
(v) When the balancing is complete, the equation is converted to the molecular form.

2. **Partial equation method:** When equations contain many reactants and products they cannot be balanced by the hit and trial method. They are then balanced by the partial equation method. In this method the overall reaction is assumed to take place through two or more simpler reactions, which can be represented by partial equations. The steps involved are:

   (i)The given chemical equation is split into two or more partial equations.
   (ii)Each partial equation is separately balanced by the hit and trial method.
   (iii)These balanced partial equations are multiplied with suitable coefficients in order to exactly cancel out those common substances which do not appear in the overall chemical equations.
   (iv)The balanced partial equations so obtained, are added to arrive at the balanced chemical equation.

13. 1. A chemical equation in which the number of atoms of different elements on the reactants side (left side) are same as those on product side (right side) is called a balanced chemical equation.$Zn + 2HCl \rightarrow ZnCl_2 + H_2 \uparrow$
    2. All the chemical equations must balance, because atoms are neither created nor destroyed in chemical reactions.
    3. The number of atoms of each element before and after reaction must be the same.
    4. According to the law of conservation of mass, the total mass of the substances that are taking part in a chemical reaction must be the same before and after the reaction.

14. **Combination reactions:** A combination reaction is one in which two or more reactants combine to form a single product. Combination reactions are again of three types.

Types of Combination reactions:

i. Combination reactions between elements.
ii. Combination reactions between compounds.
iii. Combination reactions between elements and compounds.
iv. **Combination reactions between elements:** In these reactions elements were combined to form a product.
Examples : Formation of calcium oxide by the combination elements calcium and oxygen.
$2Ca + O_2 \rightarrow 2CaO$
Formation of ammonia by the combination of elements nitrogen and hydrogen.
$N_2 + 3H_2 \rightarrow 2NH_3$
v. **Combination reactions between compounds:** In these reactions compounds were combined to form product.
Example: Reaction of calcium oxide in water to form calcium hydroxide
$CaO + H_2O \rightarrow Ca(OH)_2$
vi. **Combination reactions between elements and compounds:** In these reactions elements and compounds combined to form product.
Example:Formation of sulphur trioxide by the combination of sulphur dioxide and oxygen.
$2SO_2 + O_2 \rightarrow 2SO_3$

15. 1. A chemical equation is written in the following steps :
2. The symbols and formulae of the reactants are written on the left hand side.
3. These are separated by plus (+) sign which means react with.
4. The symbols and formulae of the products are written on the right hand side.
5. These are also separated by plus (+) sign which means also or alongwith.
6. The reactants and products are separated by arrow pointing towards products $(\rightarrow)$ which means to produce. For example

$$\overbrace{Mg + H_2SO_4}^{\text{Reactants}} \rightarrow \overbrace{MgSO_4 + H_2}^{\text{Products}}$$

CBSE Test Paper-03

Chapter 01 Chemical Reactions and Equations

1. Reaction between water and quick lime gives rise to calcium hydroxide which of the following statement are correct? **(1)**

   A. The reaction is exothermic

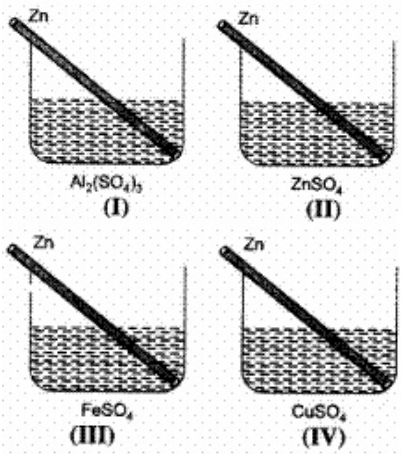
   B. The PH of final solution is less than 7

   C. The reaction is endothermic

   D. The PH of final solution is greater than 7

   a. A and C
   b. C and D
   c. A and D
   d. All of these

2. Four students A, B, C and D noted the initial colour of the solutions in beakers I, II, III and IV. After inserting zinc rods in each solution and leaving it undisturbed for two hours, noted the colour of each solution again.



They recorded their observations in the form of table given below:

Student	Colour of the solution	I	II	III	IV
A	Initial	Colour less	Colour less	Light green	Blue
	Final	Colour less	Colour less	Colour less	Colour less
B	Initial	Colour less	Light yellow	Light green	Blue
	Final	Colour less	Colour less	Light green	Colour less

C	Initial	Colour less	Colour less	Light green	Blue
	Final	Light blue	Colour less	Colour less	Light blue
D	Initial	Light green	Colour less	Light green	Blue
	Final	Colour less	Colour less	Dark green	Colour less

Which student noted the colour change in all the four beakers correctly? **(1)**

a. C
b. A
c. B
d. D

3. Choose a displacement reaction. **(1)**
   a. burning of metals
   b. addition of more active metal to a solution of a less active metal compound.
   c. extraction of metals.
   d. electrolysis
4. The colour of solid product formed on heating ferrous sulphate is **(1)**
   a. reddish brown
   b. green
   c. black
   d. colourless
5. Heat is evolved during **(1)**
   a. Combination Reaction
   b. Displacement Reaction
   c. Endothermic Reaction
   d. Combustion Reaction
6. Write the balanced chemical equation for the following reaction and identify the type of reaction.
   Zinc carbonate (s)→ Zinc oxide (s) + Carbon dioxide (g) **(1)**
7. Name the type of reaction :Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen. **(1)**
8. What is the difference between the following two reactions? **(1)**

i. $Mg + 2HCI \longrightarrow MgCI_2 + H_2$

ii. $NaOH + HCI \longrightarrow NaCI + H_2O$

9. Define corrosion. **(1)**

10. Mention five ways by which rusting can be prevented. **(3)**

11. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case. **(3)**

    i. In thermite reaction, iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.
    ii. Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.

12. Translate the following statement into a chemical equation and then balance it : Barium chloride reacts with aluminium sulphate to give aluminium. **(3)**

13. Why do we store silver chloride in dark coloured bottles? **(3)**

14. Write the formula and then balance the following equations. **(5)**
    a. Chlorine + Sodium hydroxide $\rightarrow$ Sodium chloride + Sodium chlorate + water
    b. Iron sulphate + Hydrochloric acid $\rightarrow$ Iron chloride + Hydrogen sulphide
    c. Calcium + Water $\rightarrow$ Calcium hydroxide + Hydrogen
    d. Zinc carbonate $\rightarrow$ Zinc oxide + Carbon dioxide
    e. Sodium nitrate + Sulphuric acid (conc.) $\rightarrow$ Sodium Sulphate + Nitric acid

15. i. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equations for the reactions
        a. Barium chloride solution is mixed, with copper sulphate solution and a white precipitate is obtained.
        b. On heating copper powder in air, the surface of the copper powder turns black.
    ii. What happens when hydrogen gas is passed over the heated copper oxide? Write the chemical equation involved in this reaction. **(5)**

CBSE Test Paper-03

Chapter 01 Chemical Reactions and Equations

Answers

1. c. A and D

   Explanation: Calcium hydroxide when dissolved in water is an exothermic reaction and produces an alkaline media

2. b. A

   Explanation: In I and II no reaction takes place, therefore. In III, green solution of $FeSO_4$ will change to colourless due to formation of zinc sulphate.

   Zn(s) + $\underset{green}{FeSO_4(aq)} \rightarrow \underset{colourless}{ZnSO_4(aq)}$ + Fe(s)

   In IV blue colour of $CuSO_4$ changes to colourless due to formation of zinc sulphate.

   Zn(s) + $\underset{blue}{CuSO_4(aq)} \rightarrow \underset{colourless}{ZnSO_4(aq)}$ + Cu(s)

3. b. addition of more active metal to a solution of a less active metal compound.

   Explanation: Reactions in which atoms or ions move from one compound to other to form new compound are known as Displacement reaction.

   A general displacement reaction can be represented using chemical equation as follows:

   A + BC → AC + B

   Displacement reaction takes place only when 'A' is more reactive than B. If 'B' is more reactive than 'A', then 'A' will not displace 'C' from 'BC' and reaction will not be taken place.

   Example: When zinc reacts with hydrochloric acid, it gives hydrogen gas and zinc chloride.

4. a. reddish brown

   Explanation: Ferrous sulphate (FeSO4) is green in colour,it forms reddish brown coloured ferric oxide,sulphur oxide and sulphur trioxide,the reaction is called decomposition

5. d. Combustion Reaction

Explanation: Burning takes place in combustion so it is an exothermic reaction

6. Zinc carbonate (s)→ Zinc oxide (s) + Carbon dioxide (g)
   $ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$
   This is decomposition reaction.

7. Reactions in which atoms or ions move from one compound to other to form new compound are known as Displacement reaction.
   $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$
   Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen this is displacement reaction.

8. i. Here, Mg is more reactive than H. Hence, magnesium displaces hydrogen from HCl. Therefore, it is a displacement reaction.
   ii. In this reaction, the two metal ions are exchanged between the two reactants. Hence, it is a double displacement reaction

9. When a material reacts with the external environment, over a time, its structure will be deteriorated, and breaks down into small pieces. Ultimately, it can disintegrate into the atomic level. This is known as corrosion. Most commonly this happens to metals. It is the slow eating up of the metals by the action of air and moisture of their surfaces.

10. 1. By painting metal surface with enamel paints.
    2. By applying oils and greases on surfaces.
    3. By plastic coating on the surfaces.
    4. By galvanization.
    5. By forming alloys.
    6. By Plating
    7. Keep away from moisture.

11. i. $\underset{Iron(III)oxide}{Fe_2O_3(s)} + \underset{Aluminium}{2Al(s)} \xrightarrow{\Delta} \underset{Molten\ iron}{2Fe(l)} + \underset{\text{Aluminium oxide}}{Al_2O_{3(s)}}$
    The thermite reaction is a displacement reaction.

ii. $\underset{Magnesium}{3Mg(s)} + \underset{Nitrogen}{N_2(g)} \xrightarrow{\Delta} \underset{\text{Magnesium nitride}}{Mg_3N_2(s)}$

The formation of magnesium nitride as above is a combination reaction.

12. Barium chloride reacts with aluminium sulphate to give aluminium and separates Barium sulfate($BaSO_4$).

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

13. Silver chloride easily decomposes in the presence of sunlight to liberate silver. Silver chloride is kept in dark coloured bottles to prevent this reaction, i.e., decomposition of silver chloride.

14. The formula and balance equations are as follows:
    a. Chlorine + Sodium hydroxide $\rightarrow$ Sodium chloride + Sodium chlorate + water
    $3Cl_2 + 6NaOH \rightarrow 5NaCl + NaClO_3 + 3H_2O$
    b. Iron sulphate + Hydrochloric acid $\rightarrow$ Iron chloride + Hydrogen sulphide
    $FeS + 2HCl \rightarrow FeCl_2 + H_2S$
    c. Calcium + Water $\rightarrow$ Calcium hydroxide + Hydrogen
    $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$
    d. Zinc carbonate $\rightarrow$ Zinc oxide + Carbon dioxide
    $ZnCO_3 \rightarrow ZnO + CO_2$
    e. Sodim nitrate + Sulphuric acid (conc.) $\rightarrow$ Sodium Sulphate + Nitric acid
    $2NaNO_3 + H_2SO_4 \rightarrow Na_2SO_4 + 2HNO_3$

15. i. a. $BaCl_2$ (aq) + $CuSO_4$ (aq) $\rightarrow$ $BaSO_4$ (s) + $CuCl_2$ (aq)

    Double decomposition reaction

    b. $2Cu(s) + O_2(g) \xrightarrow{Heat} 2CuO(l)$

    Redox reaction, here Cu is changing into CuO. This is oxidised and oxygen is getting reduced by adding metal to it.

    ii. If hydrogen gas is passed over heated material (CuO) the black coating on the surface turns brown as the reaction takes place and copper is obtained.

    $\underset{Black}{CuO(s)} + H_2 \xrightarrow{Heat} \underset{(Brown)}{Cu(s)} + H_2O$