**CHAPTERWISE QUESTION**

# CHEMICAL REACTIONS AND EQUATIONS

**CLASS X** **Time : 1½ hrs.**

**SET A** **Mark : 40**

**SECTION - A** **8 × 1 = 8**

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) Only (i) b) Only (ii) c) Only (iv) d) (ii) and (iv)

2. When carbon dioxide is passed through lime water?

   a) Calcium hydroxide is formed b) White precipitate of CaO is formed

   c) Lime water turns milky d) Colour of lime water disappears

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

   a) $2Mg + O_2 \rightarrow 2MgO$ b) $H_2 + Cl_2 \rightarrow 2HCl$

   c) $2Na + 2H_2O \rightarrow 2\ NaOH + H_2$ d) $NH_3 + H_2O \rightarrow NH_4OH$

4. Which of the following is not correct when a chemical reaction has taken place?

   a) Change of state b) Change in colour

   c) Evolution of gas d) No change in temperature

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

   i) $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$ ii) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

   iii) $C + O_2 \rightarrow CO_2$ iv) $Zn + 2HCl \rightarrow ZnCl_2 + H_2$

   a) (i) and (iv) b) (ii) only c) (i) and (ii) d) (iii) and (iv)

6. When dilute sulphuric acid is added to pieces of iron sulphide, hydrogen sulphide gas is produced and soluble ferrous sulphate is formed. The type of chemical reaction involved is

   a) decomposition reaction b) combination reaction

   c) displacement reaction d) double displacement reaction

7. A reddish brown coloured metal used in electric wires, when powdered and heated strongly in an open China dish, its colour turns black. When hydrogen gas is passed over this black substances, it regain its original colour. Based on this information, the metal and black coloured substances are

   a) copper and copper nitrate b) silver and silver oxide

   c) copper and copper oxide d) aluminium and aluminium oxide

8. A student adds lead and silver to two different test tubes containing an equal amount of copper sulphate solution. The student observes that the colour of the solution in the test tube with lead changes. What explains the change in the colour of the solution?

   a) A displacement reaction takes place as lead replaces copper from the solution.

   b) A combination reaction takes place as lead combines with sulphate in the solution.

   c) Decomposition reaction takes place as copper dissociates from sulphate in the solution.

   d) A double displacement reaction takes place as copper dissociates from sulphate and lead combines with sulphate in the solution.

**In the following questions (No. 9-10) a statement of Assertion followed by a statement of Reason is given. Choose the correct answer out of the following choices. 2 × 1 = 2**

   a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.

   b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.

   c) Assertion is true but reason is false. d) Assertion is false but reason is true.

9. Assertion (A) : The number of atoms of each element remains the same, before and after a chemical reaction.

   Reason (R) : Any chemical equation can be unbalanced because the mass may not be same on both sides of the equation.

10. Assertion (A) : Silver Bromide is used in black and white photography.

    Reason (R) : Silver Bromide decomposes in the presence of sunlight.

**SECTION - B**

11. i) State the law which is followed in balancing a chemical equation.

    ii) Balance the following chemical equation : $Fe + H_2O \rightarrow Fe_3O_4 + H_2$ **2**

12. What is a combination reaction? State one example giving balanced chemical equation for the reaction. **2**

13. A silver article generally turns black when kept in the open for a few days. The articles when rubbed with toothpaste again starts shining.

    i) Why do they turn black? Name the phenomenon involved.

    ii) Name the black substance formed and write its formula. **2**

**OR**

When iron rod is kept dipped in copper sulphate solution for some time, a brown coating is formed on the iron rod. What change will be observed in the colour of the solution? Also write chemical equation for the reaction involved.

## SECTION - C

14. Write the steps for balancing the chemical equation for the formation of ammonia by the combination of nitrogen and hydrogen. **3**

15. Complete and balance the following chemical equations :

    i) $CaCO_3 + HCl$ ii) $Al + HCl$ iii) $MnO_2 + HCl$ **3**

16. Differentiate between a combination reaction and a decomposition reaction. Write one chemical equation each for these reactions. **3**

17. In the following chemical reaction "zinc oxide reacts with carbon to produce zinc metal and carbon monoxide". **3**

    $ZnO + C \rightarrow Zn + CO$

    i) Identify the substance getting oxidised and the one getting reduced.

    ii) State the reason for choosing the substances in (i).

    iii) Name the type of reaction and give another example of similar type of reaction.

18. **Answer the following questions.**

    a) Why is hydrogen peroxide kept in coloured bottles? **3**

    b) Balance the following chemical equation :

    $Pb(NO_3)_{2(s)} \xrightarrow{Heat} PbO_{(s)} + NO_{2(g)} + O_{2(g)}$

    c) A dilute ferrous sulphate solution was gradually added to the beaker containing acidified potassium permanganate solution. The light purple colour of the solution fades and finally disappears. Write the correct explanation for this observation.

## SECTION - D

19. 24. a) Most of the metals acquire a dull surface when exposed to air. Name the chemical phenomenon responsible for this process.

    b) State the conditions under which the iron articles get rusted. Design an activity to investigate the conditions necessary for rusting. Suggest any two methods to prevent rusting of iron. **5**

**OR**

Write balanced chemical equations for the following statements :

i) NaOH solution is heated with zinc granules.

ii) Excess of carbon dioxide gas is passed through lime water.

iii) Dilute sulphuric acid reacts with sodium carbonate.

iv) Egg shells are dropped in hydrochloric acid.

v) Copper (II) oxide reacts with dilute hydrochloric acid.

## SECTION - E

20 **Read the following and answer the questions.**

Chemistry in Automobiles: For an internal combustion engine to move a vehicle down the road, it must convert the energy stored in the fuel into mechanical energy to drive the

wheels. In your car the distributor and battery provide this starting energy by creating an electric “spark”, which helps in combustion of fuels like gasoline. Below is the reaction depicting complete combustion of gasoline in full supply of air

$2C_8H_{18}(l) + 25O_2(g) \rightarrow$ 16 ‘X’ + 18 ‘Y’

**Answer the following questions.**

i) Name the products x and y obtained from the reaction mentioned in the above case? **1**

ii) Identify the types of chemical reaction occurring during the combustion of fuel. **1**

iii) On the basis of evolution /absorption of energy, which of the following processes are similar to combustion of fuel? **1**

i) Photosynthesis in plants ii) Respiration in the human body

iii) Decomposition of vegetable matter iv) Decomposition of ferrous sulphate

iv) ‘A student while walking on the road observed that a cloud of black smoke belched out from the exhaust stack of moving trucks on the road’.why? **1**

**CHAPTERWISE QUESTION**

# CHEMICAL REACTIONS AND EQUATIONS

**CLASS X** **Time : 1½ hrs.**

**SET B** **Mark : 40**

**SECTION - A** **8 × 1 = 8**

1. Dilute hydrochloric acid is added to granulated zinc taken in a test tube. The following observations are recorded. Point out the correct observation.

   a) The surface of metal becomes shining

   b) The reaction mixture turns milky

   c) Odour of a pungent smelling gas is recorded

   d) A colourless and odourless gas is evolved

2. On immersing an iron nail in $CuSO_4$ solution for a few minutes, you will observe

   a) No reaction takes place

   b) The colour of solution fades away

   c) The surface of iron nails acquire a black coating

   d) The colour of solution changes to green

3. Which of the following is a double displacement reaction?

   a) $Fe + S \rightarrow FeS$ b) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

   c) $CaCO_3 \rightarrow CaO + CO_2$ d) $CaO + CO_2 \rightarrow CaCO_3$

4. What happens when dilute hydrochloric acid is added to iron filings?

   a) $H_2$ gas and $FeCl_2$ are produced b) Iron salt and $H_2O$ are produced

   c) $Cl_2$ gas and $Fe(OH)_2$ are produced d) No reaction takes place

5. A powdered salt (*X*) in a dry test tube was heated that evolves brown fumes of nitrogen dioxide and a yellow residue of lead oxide is also formed. The salt (*X*) is

   a) $MgSO_3$ b) $Pb(NO_3)_2$ c) $(NH_4)_2SO_4$ d) $CaCO_3$

6. A student performs an experiment to form aluminium chloride from aluminium and chlorine. Which options gives the chemical equation of the reaction?

   a) $Al + Cl_2 \rightarrow AlCl_2$ b) $2Al + Cl_2 \rightarrow 2AlCl$

   c) $2Al + 3Cl_2 \rightarrow 2AlCl_3$ d) $3Al + 3Cl_2 \rightarrow 3AlCl_3$

7. A student notices that her silver jewellery turned dull and had a gray-black film over it after wearing for a few months. What results in the change in colour of the silver metal?

   a) dust deposits over the jewellery which changes its colour

   b) the jewellery comes in contact with air, moisture, and acids and corrodes

   c) the polish over the jewellery was removed after wearing for a few months

   d) silver breaks due to wear and tear and turns its colour changes due to rusting

8. A student notices that the bread kept out has a green coloured coating over it after a few days. What explains the reason for the student's observation?

   a) The oils in the bread oxidises and causes rancidity

   b) Bread comes in contact with atmospheric moisture and corrodes

   c) The oils in the bread reduces and cause the change in the colour of the bread

   d) Comes in contact with the atmospheric nitrogen and a layer deposit over it **1**

**In the following questions (No. 9-10) a statement of Assertion followed by a statement of Reason is given. Choose the correct answer out of the following choices. 2 × 1 = 2**

   a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.

   b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.

   c) Assertion is true but reason is false d) Assertion is false but reason is true.

9. Assertion (A) : The colour of salts does not depend on water of crystallisation.

   Reason (R) : Ferrous Sulphate crystals are blue in colour because of the seven water molecules of crystallisation.

10. Assertion (A) : Sulphur dioxide and Sulphur trioxides are released during the decomposition of iron sulphate.

    Reason (R) : This is an example of thermal decomposition.

## SECTION - B

11. What is observed when carbon dioxide gas is passed through lime water.

    i) For a short duration

    ii) For long duration? Also write the chemical equations for the reaction involved. **2**

12. Mention the colour of $FeSO_4.7H_2O$ crystals. How does this colour change upon heating? Give balanced chemical equation for the change. **2**

13. State reason for the following :

    i) Potato chips manufactures fill the packet of chips with nitrogen gas.

    ii) Iron articles are shining when new, but get coated with a reddish brown powder, when left for some time. **2**

**OR**

A copper plate was dipped into a solution of silver nitrate. After sometime, a black layer was observed on the surface of copper plate. State the reason for it and write chemical equation of the reaction involved.

## SECTION - C

14. a) Mention the four information given by an equation.

    b) State the law of conservation of mass as applicable in a chemical reaction. **3**

15. Write balanced chemical equations for the following reactions :

    i) dilute sulphuric acid reacts with aluminium powder.

    ii) dilute hydrochloric acid reacts with sodium carbonate.

    iii) Carbon-dioxide is passed through lime water. **3**

16. When is a chemical reaction considered a double displacement reaction? Explain giving example. State a difference between displacement and double displacement reaction. **3**

17. A small amount of calcium oxide is taken in a beaker and water is added slowly to it.

    i) Will there be any change in temperature of the contents? Explain.

    ii) Name and define the type of reaction taking place.

    iii) Write chemical equation for the above reaction.

18. **Answer the following questions.** **3**

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

    b) Name the oxidising and reducing agent in the following reaction :

    $$2H_2S + SO_2 \rightarrow 2H_2O + 3S\downarrow$$

    c) Why is photosynthesis considered an endothermic reaction? **3**

## SECTION - D

19. i) What happens chemically when quick lime is added to water?

    ii) Balance the following chemical equation :

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

    iii) What is decomposition reaction? Explain it with suitable example. **5**

**OR**

What happens when zinc granules are treated with dilute solutions of $H_2SO_4$, HCl, $HNO_3$, NaCl and NaOH? Also write the chemical equation.

## SECTION - E

20. **Read the following and answer the questions.**

When a more reactive element displaces a less reactive element from its compound, it is called a displacement reaction. The reaction is of two types. Single displacement reaction and double displacement reaction.

Iron being more reactive than copper displaces copper from an aqueous solution of copper sulphate. This is an example of a single displacement reaction.

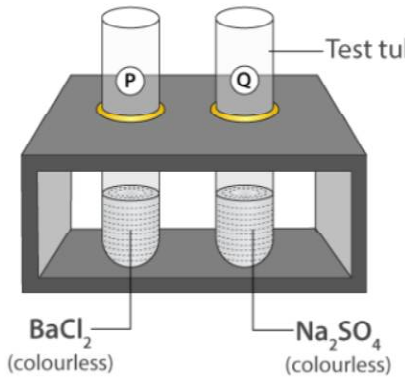
On adding silver nitrate solution to sodium bromide, a yellow ppt of silver bromide and solution of sodium nitrate is formed. This is an example of a double displacement reaction.

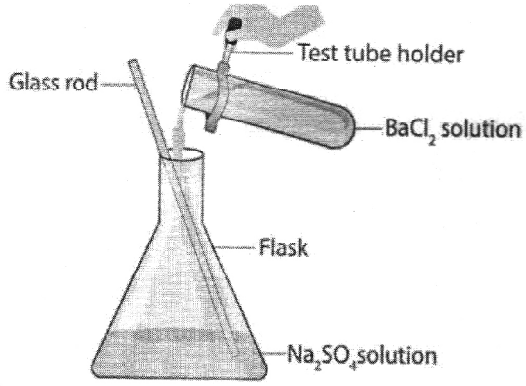
i. When dilute sulphuric acid is added to pieces of iron sulphide, hydrogen sulphide gas is produced and soluble ferrous sulphate is formed. What type of chemical reaction involved here? **1**

ii. Complete the reaction is used for the preparation of oxygen gas in the laboratory

$2KClO_{3(s)} \xrightarrow[\text{Catalyst}]{\text{Heat}}$ ..... + ..... **1**

iii. What are the products formed in the double displacement reaction discussed below? **1**




iv. Name one element which displaces aluminium from its salt. **1**

a. Zn b. Fe c. Ni d. Ca