CHEMISTRY

1 : Chemical Reactions and Equations

1. Balance the following chemical equation:

   $Fe(s) + H_2O(g) \longrightarrow Fe_3O_4(s) + H_2(g)$

   [2008]...[1M]

2. Why is respiration considered an exothermic process? **[2008]...[1M]**

3. Balance the following chemical equation:

   $Pb(NO_3)_2(s) \xrightarrow{heat} PbO(s) + NO_2(g) + O_2(g)$

   [2009]...[1M]

4. Name a reducing agent that may be used to obtain manganese from manganese dioxide.

   [2009]...[1M]

5. What change in the colour of iron nails and copper sulphate solution you observe after keeping the iron nails dipped in copper sulphate solution for about 30 minutes? **[2010]...[1M]**

6. In a double displacement reaction such as the reaction between sodium sulphate solution and barium chloride solution :

   (A) exchange of atoms takes place

   (B) exchange of ions takes place

   (C) a precipitate is produced

   (D) an insoluble salt is produced

   The correct option is : **[2020]...[1M]**

   (a) (B) and (D) (b) (A) and (C)

   (c) Only (B) (d) (B), (C) and (D)

7. A student took sodium sulphate solution in a test tube and added barium chloride solution to it. He observed that an insoluble substance has formed. The colour and molecular formula of the insoluble substance is **[2021]...[1M]**

   (a) Grey, Ba_2SO_4 (b) Yellow, $Ba(SO_4)_2$

   (c) White, $BaSO_4$ (d) Pink, $BaSO_4$

8. Sodium reacts with water to form sodium hydroxide and hydrogen gas. The balanced equation which represents the above reaction is **[2021]...[1M]**

   (a) $Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + 2H_2(g)$

   (b) $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$

   (c) $2Na(s) + 2H_2O(l) \rightarrow NaOH(aq) + 2H_2(g)$

   (d) $2Na(s) + H_2O(l) \rightarrow 2NaOH(aq) + 2H_2(g)$

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

   The above reaction is a/an **[2021]...[1M]**

   (a) displacement reaction

   (b) endothermic reaction

   (c) exothermic reaction

   (d) neutralisation reaction

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

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

    (i) HCl is oxidized to Cl_2

    (ii) MnO_2 is reduced to $MnCl_2$

    (iii) $MnCl_2$ acts as an oxidizing agent

    (iv) HCl acts as an oxidizing agent

    [2021]...[1M]

    (a) (ii), (iii) and (iv) (b) (i), (ii) and (iii)

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

11. It is important to balance the chemical equations to satisfy the law of conservation of mass. Which of the following statements of the law is incorrect?

    [2021]...[1M]

    (a) The total mass of the elements present in the reactants is equal to the total mass of the elements presents in the products.

    (b) The number of atoms of each element remains the same, before and after a chemical reaction.

    (c) The chemical composition of the reactants is the same before and after the reaction.

    (d) Mass can neither be created nor can it be destroyed in a chemical reaction.

12. Which one of the following reactions is categorised as thermal decomposition reaction?

    [2021]...[1M]

    (a) $2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$

    (b) $2AgBr(s) \rightarrow 2Ag(s) + Br_2(g)$

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

    (d) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

13. **Assertion (A) :** Burning of natural gas is an endothermic process.

Reason (R) : Methane gas combines with oxygen to produce carbon dioxide and water.

[2021]...[1M]

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

14. When aqueous solutions of potassium iodide and lead nitrate are mixed, an insoluble substance separates out. The chemical equation for the reaction involved is **[2023]...[1M]**

(a) $KI + PbNO_3 \rightarrow PbI + KNO_3$

(b) $2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$

(c) $KI + Pb(NO_3)_2 \rightarrow PbI + KNO_3$

(d) $KI + PbNO_3 \rightarrow PbI_2 + KNO_3$

15. A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is **[2023]...[1M]**

(a) X = Ca; Y = CaO; Type of reaction = Decomposition

(b) X = Mg; Y = MgO; Type of reaction = Combination

(c) X = Al; Y = Al_2O_3; Type of reaction = Thermal decomposition

(d) X = Zn; Y = ZnO; Type of reaction = Endothermic

16. **A** : Reaction of Quicklime with water is an exothermic reaction. **[2023]...[1M]**

R : Quicklime reacts vigorously with water releasing a large amount of heat.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

17. Give an example of a decomposition reaction. Describe an activity to illustrate such a reaction by heating. **[2008]...[2M]**

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

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

[2009]...[2M]

19. What happen when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride? State the physical conditions of reactants in which the reaction between them will not take place. Write the balanced chemical equation for the reaction and name the type of reaction. **[2010]...[2M]**

20. No chemical reaction takes place when granules of a solid, A, are mixed with the powder of another solid, B. However, when the mixture is heated, a reaction takes place between its components. One of the products, C, is a metal and settles down in the molten state while the other product, D floats over it. It was observed that the reaction is highly exothermic.

(i) Based on the given information make an assumption about A and B and write a chemical equation for the chemical reaction indicating the conditions of reaction, physical state of reactants and products and thermal status of reaction.

(ii) Mention any two types of reaction under which above chemical reaction can be classified. **[2010]...[3M]**

21. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity.

[2018]...[3M]

22. 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. **[2019]...[3M]**