
	<b>INDIAN SCHOOL AL WADI AL KABIR</b>	
<b>Class: X</b>	<b>Department: SCIENCE 2024 – 25</b> <b>SUBJECT: SCIENCE(CHEMISTRY)</b>	<b>Date of submission:</b> <b>08-05-2024</b>
<b>Worksheet No: 01</b> <b>WITH ANSWERS</b>	<b>CHAPTER / UNIT: CHEMICAL REACTIONS</b> <b>AND EQUATIONS</b>	<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### OBJECTIVE TYPE QUESTIONS

#### MULTIPLE CHOICE QUESTIONS

- Which of the following is an example of endothermic process?
  - Formation of slaked lime
  - Decomposition of vegetable matter into compost
  - Dissolution of ammonium chloride in water
  - Digestion of food in our body
- Which of the following is not a thermal decomposition reaction? (CBSE 23-24)
  - $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$
  - $2\text{FeSO}_4(\text{s}) \rightarrow \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_2(\text{g}) + \text{SO}_3(\text{g})$
  - $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
  - $2\text{Pb}(\text{NO}_3)_2(\text{s}) \rightarrow 2\text{PbO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$
- In order to balance the following chemical equation, the values of the coefficients x , y and z are: (CBSE 23-24)

$$x\text{Zn}(\text{NO}_3)_2(\text{s}) \rightarrow y\text{ZnO}(\text{s}) + z\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$$
  - 4,2,2
  - 4,4,2
  - 2,2,4
  - 2,4,2
- Strong heating of ferrous sulphate leads to the formation of a brown solid and two gases. This reaction can be categorised as
  - displacement and redox.
  - decomposition and redox.
  - displacement and endothermic.
  - decomposition and exothermic.

5. 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 the molecular formula of the insoluble substance is:
- Grey,  $\text{Ba}_2\text{SO}_4$
  - Yellow,  $\text{Ba}(\text{SO}_4)_2$
  - White,  $\text{BaSO}_4$
  - Pink,  $\text{BaSO}_4$
6.  $\text{C}_6\text{H}_{12}\text{O}_6(\text{aq}) + 6\text{O}_2(\text{aq}) \rightarrow 6\text{CO}_2(\text{aq}) + 6\text{H}_2\text{O}(\text{l}) + \text{energy}$   
The above reaction is a/an
- Displacement reaction
  - Endothermic reaction
  - Exothermic reaction
  - Neutralisation reaction
7. Which of the following statements about the following reaction are correct?  
 $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
- HCl is oxidised to  $\text{Cl}_2$
  - $\text{MnO}_2$  is reduced to  $\text{MnCl}_2$
  - $\text{MnCl}_2$  acts as an oxidising agent
  - HCl acts as an oxidising agent
- (ii), (iii) and (iv)
  - (i), (ii) and (iii)
  - (i) and (ii) only
  - (iii) and (iv) only
8. 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?
- The total mass of the elements present in the reactants is equal to the total mass of the elements present in the products.
  - The number of atoms of each element remains the same before and after the reaction.
  - The chemical composition of the reactants is the same before and after the reaction.
  - Mass can neither be created nor destroyed in a chemical reaction.
9. The neutralisation reaction between an acid and a base is a type of:
- Double displacement reaction
  - Displacement reaction
  - Addition reaction
  - Decomposition reaction
10. You are given the following chemical reaction:
- $$\text{CuO} + \text{H}_2 \xrightarrow{\text{Heat}} \text{Cu} + \text{H}_2\text{O}$$
- This reaction represents:
- Combination reaction as well as double displacement reaction
  - Redox reaction as well as displacement reaction

- (c) Double displacement reaction as well as redox reaction
- (d) Decomposition reaction as well as displacement reaction

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

- (a)  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
- (b)  $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$
- (c)  $2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$
- (d)  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

### ASSERTION-REASONING QUESTIONS

For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i) , (ii), (iii) and (iv) as given below:

- (i) Both A and R are true and R is the correct explanation of the Assertion.
- (ii) Both A and R are true but R is not the correct explanation of the Assertion.
- (iii) A is true but R is false.
- (iv) A is false but R is true.

12. Assertion: Lead nitrate on thermal decomposition gives lead oxide, brown coloured nitrogen dioxide and oxygen gas.

Reason: Lead nitrate reacts with potassium iodide to form yellow ppt of lead iodide and the reaction is double displacement as well as precipitation reaction.

13. Assertion: After white washing the walls, a shiny white finish on walls is obtained after two to three days.

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

14. Assertion: Respiration is considered as an exothermic reaction

Reason: Exothermic reactions are those reactions in which heat is absorbed.

15. Assertion: Corrosion of iron is commonly known as rusting.

Reason: Corrosion of iron occurs in presence of water and air.

### TWO MARKS QUESTIONS

16. In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.

17. A white salt on heating decomposes to give brown fumes and a residue is left behind.

- (a) Name the salt.
- (b) Write the equation for the decomposition reaction.

18. Identify the type of reactions in each of the following reactions:

- (i)  $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
- (ii)  $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
- (iii)  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

19. Write chemical equation for the chemical reaction which occurs when the aqueous solutions of Barium chloride and Sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction.
20. A Zinc plate was put into a solution of copper sulphate kept in a glass container. It was found that blue colour of the solution gets fader and fader with the passage of time. After a few days when the zinc plate was taken out of the solution, a number of holes were observed on it.
- (a) State the reason for changes observed on the zinc plate.  
(b) Write the chemical equation for the reaction involved.
21. (i) Why do potato chips manufacturers fill the packet of chips with nitrogen gas?  
(ii) Write one equation each for the decomposition reactions where energy is supplied in the form of (a) heat (b) light and (c) electricity.
22. Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. (CBSE 23-24).
23. Give an example of a decomposition reaction. Describe an activity to illustrate such a reaction by heating.

### **THREE MARKS QUESTIONS**

24. What happens when food materials containing fats and oils are left for a long time? List two observable changes and suggest a way by which this phenomenon can be prevented.
25. 2 g of ferrous sulphate crystals are heated in a dry boiling tube.
- (a) List any two observations.  
(b) Name the type of chemical reaction taking place.  
(c) Write balanced chemical equation for the reaction and name the products formed.
26. State the type of chemical reactions with chemical equations that take place in the following.
- (a) Magnesium ribbon is burnt in air.  
(b) Electric current is passed through water.  
(c) Ammonia and hydrogen chloride gases are mixed.

### **FIVE MARKS QUESTIONS**

27. (a) State the various characteristics of chemical reactions.  
(b) State one characteristic each of the chemical reaction which takes place when:
- (i) Dilute hydrochloric acid is added to sodium carbonate.  
(ii) Dilute sulphuric acid is added to barium chloride solution.  
(iii) Quick lime is treated with water.

28. What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride?
- Write balanced chemical equation for the reaction which takes place.
  - State the physical conditions of reactants in which the reaction will not take place.
  - Name the type of chemical reaction.
29. (i) Identify in the following reaction:  
$$\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$$
- The substance oxidised and
  - The substance reduced.
- (ii) What can be seen when a strip of copper metal is placed in a solution of silver nitrate?
30. An aqueous solution of metal nitrate P reacts with sodium bromide solution to form yellow precipitate of compound Q which is used in photography. Q on exposure to sunlight undergoes decomposition reaction to give the metal present in P and a reddish-brown gas. Identify P and Q. Write chemical equation and the type of chemical reaction.

### **PREVIOUS YEAR BOARD QUESTIONS**

31. When copper powder is heated in a watch glass, a black substance is formed.
- Why is this black substance formed? Name it.
  - How can this black substance be reversed to its original form?
32. Silver chloride kept in a china dish turns grey in sunlight.
- Write the colour of silver chloride when it was kept in the china dish.
  - Name the type of chemical reaction taking place and write the chemical equation for the reaction.
  - State one use of the reaction. Name one more chemical which can be used for the same purpose.
33. A shining metal 'M', on burning gives a dazzling white flame and changes to a white powder 'N'.
- Identify 'M' and 'N'.
  - Represent the above reaction in the form of a balanced chemical equation.
  - Does 'M' undergo oxidation or reduction in this reaction? Justify.
34. In the electrolysis of water
- Name the gases liberated at anode and cathode.
  - Why is it that the volume of gas collected on one electrode is two times that on the other electrode?
  - What would happen if dil.  $\text{H}_2\text{SO}_4$  is not added to water?
35. Write the balanced chemical equations for the following reactions:
- Sodium carbonate on reaction with hydrochloric acid in equal molar concentrations gives sodium chloride and sodium hydrogen carbonate.

- (b) Sodium hydrogen carbonate on reaction with hydrochloric acid gives sodium chloride, water and liberates carbon dioxide.
- (c) Copper sulphate on treatment with potassium iodide precipitates cuprous iodide, liberates iodine gas and also forms potassium sulphate.

### CASE STUDY BASED QUESTIONS

36. A chemical reaction is a representation of chemical change in terms of symbols and formulae of reactants and products. There are various types of chemical reactions like combination, decomposition, displacement, double displacement, oxidation and reduction reactions. Reactions in which heat is released along with the formation of products are called exothermic chemical reactions. All combustion reactions are exothermic reactions. In decomposition reactions, a single reactant breaks down to form two or more products.

Decomposition reaction is opposite to reaction. Thermal decomposition reactions use energy in the form of heat for decomposition of reactants. Electrolytic decomposition reactions involve the use of electrical energy for the decomposition of reactant molecules. Photolysis or photochemical decomposition reactions involves the use of light energy for the purpose of decomposition.

- (i) Silver chloride on exposure to sunlight for a long duration turns grey. Write balanced chemical equation for this reaction
- (ii) Decomposition reactions are endothermic in nature. Explain
- (iii) Write two differences between combination and decomposition reactions

OR

A white salt on heating decomposes to give brown fumes and a residue is left behind.

- (a) Name the salt.
- (b) Write the equation for the decomposition reaction.

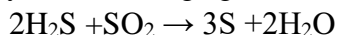
37. The reactions in which both oxidation and reduction reactions take place simultaneously are called redox reactions. Oxidation and reduction can be defined in terms of addition or removal of oxygen or hydrogen.

- (i) Define oxidising agent.
- (ii) Identify the oxidising agent in the following reaction,  $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
- (iii) In the reaction,  $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow \text{S} + 2\text{HCl}$

Identify the substance oxidised and the substance reduced.

OR

Identify the oxidising agent and reducing agent in the reaction



X-----X

## ANSWERS

### OBJECTIVE TYPE QUESTIONS

#### MULTIPLE CHOICE QUESTIONS

Q.No.	Answers
1	(c) Dissolution of Ammonium chloride in water
2	(a) $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$
3	(a) 2,2,4
4	(b) decomposition and redox.
5	(c) White, $\text{BaSO}_4$
6	(c) Exothermic reaction
7	(c) (i) and (ii) only
8	(c) The chemical composition of the reactants is the same before and after the reaction.
9	(a) Double displacement reaction
10	(b) Redox reaction as well as displacement reaction
11	(d) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

#### ASSERTION-REASONING QUESTIONS

12	(iii) A is true but R is false.
13	(ii) Both A and R are true but R is not the correct explanation of the Assertion.
14	(iii) A is true but R is false.
15	(ii) Both A and R are true but R is not the correct explanation of the Assertion

#### TWO MARK QUESTIONS

16	$\text{Cu}_{(s)} + 2\text{AgNO}_{3(aq)} \rightarrow \text{Cu}(\text{NO}_3)_{2(aq)} + 2\text{Ag}_{(s)}$
17	(a) Lead nitrate $2\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$
18	(i) Displacement reaction (ii) Combination reaction (iii) Decomposition reaction.
19	$\text{BaCl}_2(aq) + \text{Na}_2\text{SO}_4(aq) \rightarrow \text{BaSO}_4(s) + 2\text{NaCl}(aq)$ Compound precipitated - $\text{BaSO}_4$ Ions present - $\text{Ba}^{2+}$ , $(\text{SO}_4)^{2-}$
20	(a) It is because zinc has displaced copper from copper sulphate. Zinc metal has been used to form zinc sulphate, therefore, holes were observed. (b) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$ Blue colourless
21	(i) To provide an inert atmosphere to prevent chips from getting oxidised. $\text{N}_2$ does not allow chips to get spoiled by oxidation.

	(ii) (a) Heat- $CaCO_3 \rightarrow CaO + CO_2$ light (b) Light- $2AgCl \rightarrow 2Ag + Cl_2$ electricity (c)Electricity- $2H_2O \rightarrow 2H_2 + O_2$
22	Copper oxide , The colour of copper oxide is black. $2Cu+O_2 \rightarrow 2CuO$
23	When lead nitrate is heated in a test tube it forms lead oxide nitrogen dioxide and oxygen. Activity: Take lead nitrate powder which is white in colour in a test tube. Heat this test tube over a flame. Observation: Brown fumes are evolved and brownish residue is left in the test tube. (Explain in detail) $2Pb(NO_3)_2 (s) \xrightarrow{\text{Heat}} 2PbO(s) + 4NO_2(g) + O_2 (g)$

### THREE MARK QUESTIONS

24	The food will get rancid / oxidised Smell and taste changes Antioxidants can be added / airtight containers /flush with use of nitrogen
25	(a) Observations:  <ul style="list-style-type: none"> <li>• Colour changes from green to white</li> <li>• Formation of reddish-brown Ferric oxide (<math>Fe_2O_3</math>)/evolution of <math>SO_2/SO_3</math> gas.</li> </ul> (c) Decomposition reaction $FeSO_4 \cdot 7 H_2O \rightarrow FeSO_4 + 7 H_2O$ (c) $2FeSO_4 \xrightarrow{\text{Heat}} Fe_2O_3 + SO_2 + SO_3$ <div style="display: flex; justify-content: space-around; width: 100%;"> <span>Ferric oxide</span> <span>Sulphur dioxide</span> <span>Sulphur trioxide</span> </div>
26	(a) $2Mg + O_2 \rightarrow 2MgO$ - Combination reaction(redox reaction) (b) $2H_2O \rightarrow 2H_2 + O_2$ - Electrical decomposition reaction. (c) $NH_3 + HCl \rightarrow NH_4Cl$ - Combination reaction.

### FIVE MARK QUESTIONS

27	(a) change in state change in colour evolution of a gas change in temperature. Formation of precipitate. (b)(i) evolution of gas (ii) Formation of precipitate (iii)Change in temperature.
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28	(a) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$ (b) <i>Solid State</i> Double displacement reaction.
29	(i) (a) The substance oxidised -C (b) The substance reduced- ZnO (ii) The solution will become blue, shiny silver metal gets deposited. $Cu(s) + 2AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2Ag(s)$
30	$AgNO_3 + NaBr \rightarrow AgBr + NaNO_3$ (Double displacement reaction) P- $AgNO_3$ Q- $AgBr$ $2AgBr \rightarrow 2Ag + Br_2$ (Photochemical decomposition)

### PREVIOUS YEAR BOARD QUESTIONS

31	(a) Copper reacts with oxygen (oxidation) to form copper oxide which is black in colour. (b) By passing hydrogen gas over heated copper oxide we can get back the brown coloured metal
32	(a) White (b) Photochemical decomposition $2AgCl \rightarrow 2Ag + Cl_2$ (c) Used in black and white photography Silver bromide ( $AgBr$ )
33	(a) M- Mg, N- $MgO$ (b) $2Mg + O_2 \rightarrow 2MgO$ (c) Oxidation as it gains oxygen.
34	(a) Anode-Oxygen, Cathode-Hydrogen (b) In water, hydrogen and oxygen are in the ratio 2:1 (c) the conductivity will decrease and electrolysis becomes slow
35	(a) $Na_2CO_{3(s)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + NaHCO_{3(aq)}$ (b) $NaHCO_{3(s)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)} + CO_{2(g)}$ (c) $2CuSO_{4(aq)} + 4KI_{(aq)} \rightarrow 2K_2SO_{4(aq)} + Cu_2I_{2(s)} + I_2$

### CASE STUDY BASED QUESTIONS

36	(i) $2AgCl \rightarrow 2Ag + Cl_2$ (ii) Decomposition reactions require energy in the form of heat, light or electricity (iii) Combination reactions are reactions in which two or more reactants combine to form a single product. Combination reactions are exothermic in nature Decomposition reactions are reactions in which single reactant breaks down to form two or more products. Decomposition reactions are endothermic in nature. OR (a) Lead nitrate $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$
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37	(i)The substance which helps in oxidation by supplying oxygen. (ii) ZnO (iii)Substance oxidised-H <sub>2</sub> S and Substance reduced-Cl <sub>2</sub> OR Oxidising agent- SO <sub>2</sub> Reducing agent-H <sub>2</sub> S
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