



## CHEMISTRY

### BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

#### CHEMICAL REACTIONS AND EQUATIONS

##### Example

1. Zinc reacts with dilute sulphuric acid to give zinc sulphate and hydrogen.

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2. Magnesium metal reacts with hydrochloric acid to form magnesium chloride and hydrogen.

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3. Iron reacts with water (steam) to form ferric oxide liberating hydrogen gas.

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4. Write the balanced chemical equations for the following reactions :

(i) Hydrogen + Chlorine  $\rightarrow$  Hydrogen chloride

(ii) Magnesium oxide + Carbon  $\rightarrow$  Magnesium + Carbon monoxide

(iii)

Phosphorus pentachloride + Water  $\rightarrow$  Phosphoric acid + Hydrogen chloride

(iv) Sulphur dioxide + Oxygen  $\rightarrow$  Sulphur trioxide

(v) Sodium + Water  $\rightarrow$  Sodium hydroxide + Hydrogen .

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5. Write the balanced chemical equations with state symbols for the following reactions :

(i) Iron filings react with steam to produce iron (III) oxide and hydrogen gas.

(ii) Magnesium reacts with nitrogen upon heating to form magnesium nitride.

(iii) Ethane burns in oxygen to form carbon dioxide and water.

(iv) Sodium hydroxide solution (in water) reacts with hydrochloric acid (in water) to form sodium chloride (in water) and water.

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6. What information is conveyed by the following equation ?



(Given : atomic mass of Ca = 40, C = 12, O = 16)

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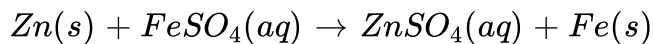
7. Convey the following information in the form of balanced chemical equations (i) An aqueous of ferrous sulphate reacts with an aqueous solution of sodium hydroxide to form precipitate of ferrous hydroxide

and sodium sulphate remains in solution. (ii) Potassium metal reacts with water to give potassium hydroxide solution and hydrogen gas is evolved in the reaction. (iii) Solid potassium chlorate upon heating forms potassium chloride and liberates oxygen gas. (iv) An aqueous solution of aluminium chloride reacts with an aqueous solution of ammonium hydroxide solution to form aluminium hydroxide and ammonium chloride.



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**8.** Name the substance oxidised, reduced, oxidising agent and reducing agent in the following reaction :



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1. Why should a magnesium ribbon be cleaned before burning in air?

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2. Write the balanced equation for the following chemical reactions.

(i) Hydrogen + Chlorine  $\rightarrow$  Hydrogen chloride

(ii) Barium chloride + Aluminium sulphate  $\rightarrow$  Barium sulphate +  
Aluminium chloride

(iii) Sodium + Water  $\rightarrow$  Sodium hydroxide + Hydrogen

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3. Write a balanced chemical equation with state symbols for the following reactions.

(i) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.

(ii) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.



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4. A solution of the substance 'X' is used for white washing.

(i) Name the substance 'X' and write its formula.

(ii) Write the reaction of the substance 'X' with water.



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5. With the help of an experiment show that in the electrolysis of acidulated water, the volume of one gas is twice the volume of the other gas. Name the gas.



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6. When you mix solutions of lead (II) nitrate and potassium iodide.

(i) What is the colour of the precipitate formed ? Name the compound involved.

(ii) Write a balanced chemical equation for the reaction

(iii) Is this a double displacement reaction ?

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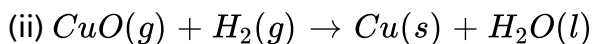
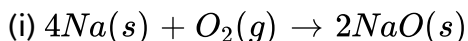
7. Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

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8. Give an example of a double displacement reaction.

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9. Identify the substances that are oxidised and the substances that are reduced in the following reactions.



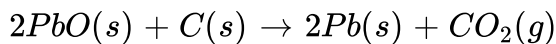
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10. Magnesium ribbon burns with a dazzling flame in air (or oxygen) and changes to white substance magnesium oxide. Is magnesium being oxidised or reduced in this reaction ?

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### NCERT End Exercise

1. Which of the statements about the reaction below are incorrect?



- (a) Lead is getting reduced.
- (b) Carbon dioxide is getting oxidised.
- (c) Carbon is getting oxidised.
- (d) Lead oxide is getting reduced.

A. a and b



B. a and c

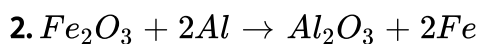
C. a, b and c

D. all are incorrect

**Answer: A**



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The above reaction is an example of a :

A. Combination Reaction

B. Double Displacement Reaction

C. Decomposition Reaction

D. Displacement Reaction

**Answer: D**



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3. What happens when dilute hydrochloric acid is added to iron fillings ?

Tick 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.

**Answer:**

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4. What is a balanced chemical equation? Why should chemical equations be balanced?

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5. Translate the following statements into chemical equations and then balance them:

(a) Hydrogen gas combines with nitrogen to form ammonia.

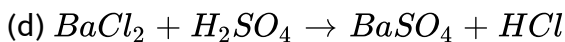
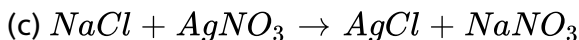
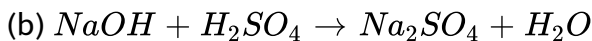
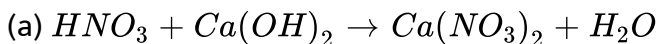
(b) Hydrogen sulphide gas burns in air to give water and sulphur dioxide

(c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.

(d) Potassium metal react with water to give potassium hydroxide and hydrogen gas.

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6. Balance the following chemical equations:



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7. Write the balanced chemical equations for the following reactions:

(a) Calcium hydroxide + Carbon dioxide  $\rightarrow$  Calcium carbonate + Water

(b) Zinc + Silver nitrate  $\rightarrow$  Zinc nitrate + Silver

(c) Aluminium + Copper chloride  $\rightarrow$  Aluminium chloride + Copper

(d) Barium chloride + Potassium sulphate  $\rightarrow$  Barium sulphate + Potassium chloride

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8. Write the balanced chemical equations for the following and identify the type of reaction in each case :

(a) Barium + Potassium  $\rightarrow$  Barium + Potassium

chloride (aq) sulphate (aq) sulphate (s) chloride (aq)

(b) Zinc carbonate (s)  $\rightarrow$  Zinc oxide (s) + Carbon dioxide (g)

(c) Hydrogen (g) + Chlorine (g)  $\rightarrow$  Hydrogen chloride (g)

(d) Magnesium (s) + Hydrochloric acid (aq)  $\rightarrow$  Magnesium chloride (aq) + Hydrogen (g)

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9. What does one mean by exothermic and endothermic reactions? Give examples

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10. Why is respiration considered an exothermic reaction? Explain.

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11. Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

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12. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

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13. (a) What is the difference between displacement and double displacement reactions ? Write equations for these reactions.

(b) What do you mean by a precipitation reaction ? Explain an example.

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

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15. What do you mean by a precipitation reaction? Explain by giving examples.

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**16.** Explain the following in terms of gain or loss of oxygen with two examples each.

(a) Oxidation

(b) Reduction

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**17.** A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed

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**18.** Why do we apply paint on iron articles?

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**19.** Oil and fat containing food items are flushed with nitrogen. Why?

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20. Explain the following terms with one example each:

(a) Corrosion (b) Rancidity

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### Very Short Answer Questions

1. Why does not a wall immediately acquire a white colour when a coating of slaked lime is applied on it ?

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2. What is rust ?

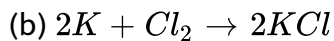
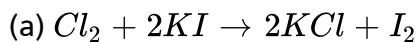
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3. Identify the most reactive and least reactive metal : *Al, K, Ca, Au*.

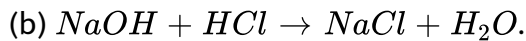
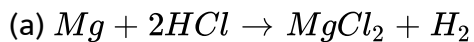
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4. Which of the following is a combination and which is a displacement reaction?



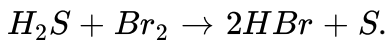
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5. What is the difference between the following two reactions ?



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6. Identify the compound which is oxidised in the following reaction



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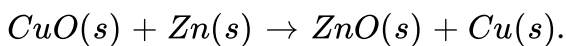
7. Suggest two ways to check the rancidity of food articles.

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8. Name two metals which donot get corroded.

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9. Identify the substance oxidised and reduced in the reaction :



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10. How will you know whether a sample of cheese has become rancid or not ?

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11. Why are eatables preferably packed in aluminium foils ?

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12. What happens chemically when quick lime is added to water ?

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13. Give an example of exothermic reaction.

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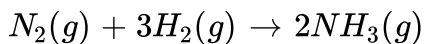
14. Give an example of endothermic reaction.

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15. Name the gas that can be used for the storage of fresh sample of chips for a long time.

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16. Name the type of reaction



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17. Give an example of a double displacement reaction (only reaction with complete balanced equation).

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18. In the reaction  $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$ , identify which one is reduced and which one is oxidized ?

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19. Name two salts that are used in black and white photography.

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20. State the chemical change that takes place when lime stone is heated

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21. Write a balanced equation for a chemical reaction that can be characterised as precipitation.

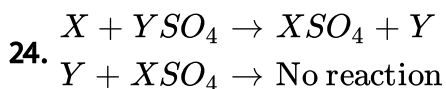
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22. Name the law which requires the balancing of chemical equation.

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23. What is meant by thermal decomposition reaction ? Explain with an example.

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Of the two elements 'X' and 'Y' which is more reactive and why ?

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25. Write a complete balanced chemical equation for the following reaction :

sodium hydroxide + Sulphuric acid  $\rightarrow$



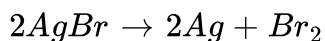
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26. On heating copper powder in air, the surface of copper powder becomes coated with black CuO. How can this black coating be converted into brown copper ? Write chemical equation for the reaction that occurs during the colour change.



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27. Write the essential condition for the following reaction to take place



Write one application of this reaction.



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28. Write the chemical formula of rust.



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29. Give an example of photochemical reaction.

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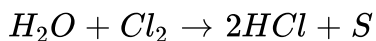
30. What is combination reaction ? Give an example.

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31. What happens when carbon dioxide gas is bubbled through lime water in small amount ?

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32. Identify the oxidising and reducing agent in the following reaction :



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**33.** Write balanced chemical equation for the following reaction :

Natural gas burns in air and combines with oxygen to form carbon dioxide and water.

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**34.** Give one example each of (i) change in state (ii) evolution of a gas.

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**35.** Why does silver chloride turn grey in sunlight ?

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**36.** Name two metals which donot get corroded.

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**37.** What is double displacement reaction ? Give one example.

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**38.** Can combination reaction be an oxidation reaction ? If yes, give an example.

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**39.** What is the nature of reaction when sulphuric acid is dilutes with water ?

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**40.** A small amount of ferrous sulphate was heated in a hard glass test tube :

(i) Write the equation involved in the above reaction.

(ii) What type of reaction is taking place ?

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41. Write a balanced equation for a chemical reaction that can be characterised as precipitation.

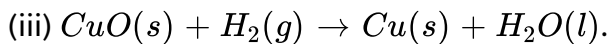
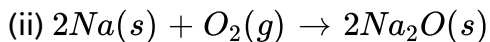
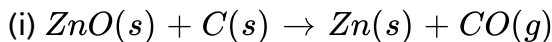
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42. What happens chemically when quick lime is added to water ?

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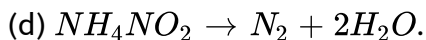
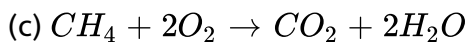
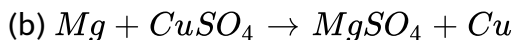
## Short Answer Questions

1. Identify the substance oxidised and substance reduced in the following reactions :



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2. Which types of reactions are represented by the following equations ?



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3. What happens when :

$CO_2(g)$  is bubbled through lime water (i) in small amount (ii) in excess ?

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4. Aluminium is a reactive metal but is still used for packing food articles.

Why ?

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5. Give one example each of :

(i) Thermal decomposition reaction

(ii) Electrolytic decomposition reaction

(iii) Photo decomposition reaction.

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6. What are neutralisation reactions ? Why are they so named ? Give one example.

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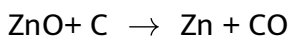
7. (a) Why is combustion reaction an oxidation reaction ?

(b) How will you test whether the gas evolved in a reaction is hydrogen ?

(c) Why does not silver evolve hydrogen on reacting with dilute sulphuric acid ?

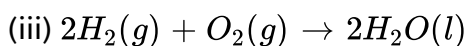
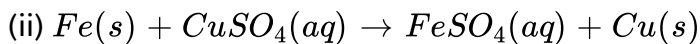
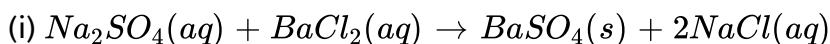
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8. What is an oxidation reaction (i) the substance oxidised and (ii) the substance reduced:



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9. Identify the type of reaction in the following examples :



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10. Solid calcium oxide was taken in a container and water was added slowly to it

(i) State two observations made in the experiment.

(ii) write the name of the chemical formula of thw product.

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11. A house wife wanted her house to be white washed. She bought 10 kg of quick lime from the market and dissolved in 30 litres of water. She noticed that water started boiling even when it was not being heated. Give reason for her observation. Write the corresponding equation and name the product formed.

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12. (i) What is observed when a solution of potassium iodide to a solution of lead nitrate taken in a test tube ?

(ii) What type of reaction is this ?

(iii) Write a balanced equation to represent the above reaction.

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13. What change in colour is observed when white silver chloride is left exposed to sun light ? State the type of chemical reaction in this change.

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14. (a) What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride ?

(b) Write the balanced chemical equation for the reaction which takes place.

(c) State the physical conditions of reactants in which the reaction will not take place.



(d) Name the type of chemical reaction which occurs.

(e) Give one example of another reaction which of the same type as the above reaction.

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**15.** "Oxidation and reduction processes occur simultaneously". Justify the statement with the help of an example.

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**16.** "Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate"

(i) Translate the above statement into a chemical equation.

(ii) State two types in which this reaction can be classified.

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17. Why do we store silver chloride in dark coloured bottles?

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18. Design an activity to show a decomposition reaction in which light is used to decompose a reactant. Write chemical equation for the reaction and state its one use.

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19. A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction.

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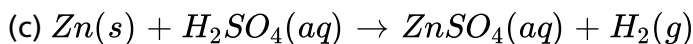
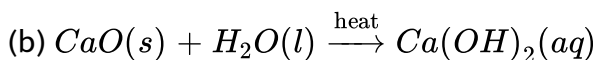
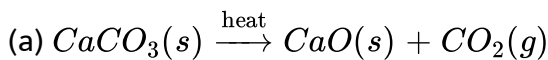
20. A White salt upon heating decomposes to give brown fumes and a residue is left behind.

(i) Name the salt.

(ii) Write the equation for the decomposition reaction.

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21. Name the type of chemical reaction represented by the following equations :



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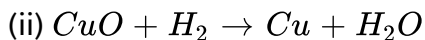
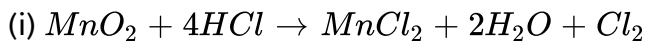
22. A small amount of ferrous sulphate was heated in a hard glass test tube :

(i) Write the equation involved in the above reaction.

(ii) What type of reaction is taking place ?

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**23.** What is redox reaction ? Identify the substance oxidised and the substance reduced in the following reactions :



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**24.** (a) Can combination reaction be an oxidation reaction ?

(b) How will you test whether the gas evolved in a reaction is hydrogen ?

(c) Why does copper not evolve hydrogen on reacting with dilute sulphuric acid ?

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25. A green coloured hydrated metallic salt on heating loses its water of crystallisation molecules and gives a suffocating smell. Identify the salt and write the chemical equation.

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26. Explain why :

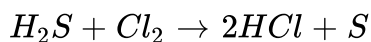
(a) Respiration is an exothermic reaction.

(b) When blue salt of copper sulphate is heated, it becomes colourless.

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27. (a) Give an example for a combination reaction which is exothermic.

(b) Identify the oxidising agent and reducing agent in the following reaction.

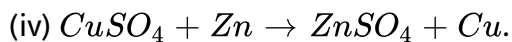
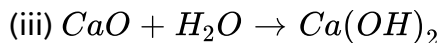
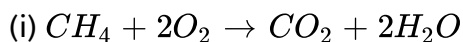


(c) Name the phenomenon due to which the taste and smell of oily food

changes when kept for a long time in open. Suggest one method to prevent it.

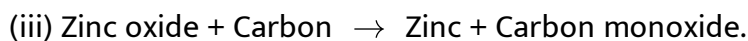
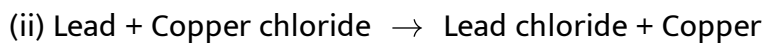
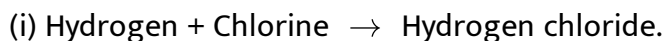
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**28.** Identify the type of reaction from the following equations



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**29.** Write the balance chemical equations for the following chemical reactions :



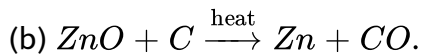
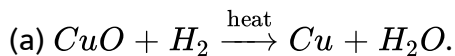
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30. Write chemical equations for the reactions taking place when :

- (i) Iron reacts with steam
- (ii) Magnesium reacts with dilute HCl
- (iii) Copper is heated in air.

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31. Consider the chemical equations given below and answer the questions which follow :



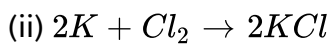
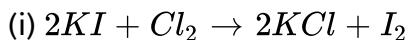
- (i) Name the substances that are respectively oxidised and reduced.
- (ii) Identify the reducing agents in each case.

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32. Write a balanced chemical equation for the process of photosynthesis given the physical states of all substances involved and the conditions of the reaction.

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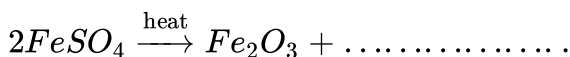
33. Two reactions are given below :



identify the type of reaction giving justification in each case.

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34. (a) Complete the following equation for the chemical reaction



(b) What happens when water is added to quick lime ? Write chemical equation.

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**35.** Name two salts that are used in black and white photography. Give equations of the reactions that occur when these are exposed to sun light

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**36.** (a) What is meant by a chemical reaction ? Explain with the help of an example

(b) Given one example each of a chemical reaction characterised by:

- (i) evolution of a gas
- (ii) change in colour
- (iii) formation of a precipitate
- (iv) change in temperature
- (v) change in state.

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**37.** Write balanced chemical equations for the following reactions :

Hydrogen sulphide gas burns in air to give water and sulphur dioxide

(ii) Barium chloride reacts in aqueous solution reacts with zinc sulphate to give zinc chloride and barium sulphate.

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**38.** Ferrous sulphate decomposes with the evolution of a gas having a characteristic odour of burning sulphur. Write the chemical reaction involved and identify the type of reaction.

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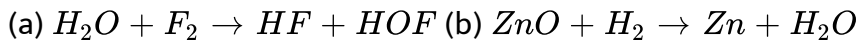
**39.** Explain why :

(a) Respiration is an exothermic reaction.

(b) When blue salt of copper sulphate is heated, it becomes colourless.

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**40.** Identify the oxidising and reducing agent in the following reactions :



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**41.** A substance X, which is an oxide of a group 2 element, is used intensively in the cement industry. This element is present in bones also. On treatment with water it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.

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**42.** Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid, whereas copper does not. Explain, why?

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

(a) Why do silver articles turn black when kept in the open for a few days?

Name the phenomenon involved.

(b) Name the black substance formed and give its chemical formula.

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**44.** What happens when a piece of :

(a) zinc metal is added to copper sulphate solution ?

(b) aluminium metal is added to dilute hydrochloric acid ?

Write chemical equations involved.

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**45.** (a) What is meant by a chemical reaction ? Explain with the help of an example

(b) Given one example each of a chemical reaction characterised by:

- (i) evolution of a gas
- (ii) change in colour
- (iii) formation of a precipitate
- (iv) change in temperature
- (v) change in state.

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**46.** Write balanced chemical equations for the following reactions :

- (i) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.
- (ii) Sodium hydroxide solution is heated with granulated zinc.

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**47.** "Oxidation and reduction processes occur simultaneously". Justify the statement with the help of an example.

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**48.** Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.

(a) Nitrogen gas is treated with hydrogen gas in the presence of a catalyst at 773 K to form ammonia gas.

(b) Sodium hydroxide solution is treated with acetic acid to form sodium acetate and water.

(c) Ethanol is warmed with ethanoic acid to form ethyl acetate in the presence of concentrated  $H_2SO_4$ .

(d) Ethane is burnt in the presence of oxygen to form carbon dioxide, water and releases heat and light.



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**49.** Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.

(a) Iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.

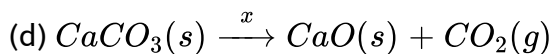
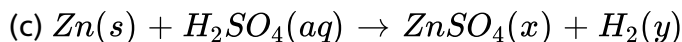
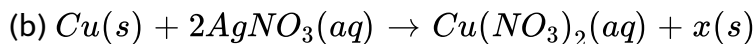
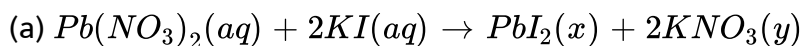
(b) Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.

(c) Chlorine gas is passed in an aqueous potassium iodide solution to form potassium chloride solution and solid iodine.

(d) Ethanol is burnt in air to form carbon dioxide, water and releases heat.

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50. Complete the missing components/variables given as x and y in the following reactions



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51. Which among the following changes are exothermic or endothermic in nature?

(a) Decomposition of ferrous sulphate

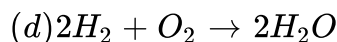
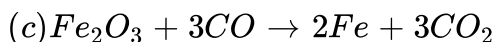
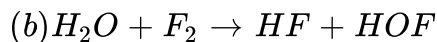
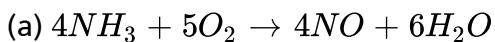
(b) Dilution of sulphuric acid

(c) Dissolution of sodium hydroxide in water

(d) Dissolution of ammonium chloride in water

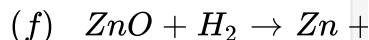
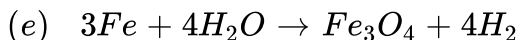
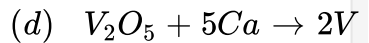
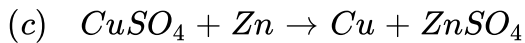
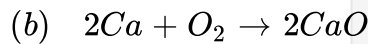
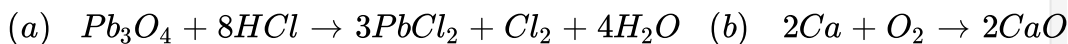
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52. Identify the reducing agent in the following reactions.



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53. Identify the oxidising agent (oxidant) in the following reactions



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54. write the balanced chemical equations for the following reaction.

(a) 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 iodide ( $Cu_2I_2$ ), liberates iodine gas and also forms potassium sulphate.

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55. A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction.

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**56.** Ferrous sulphate decomposes with the evolution of a gas having a characteristic odour of burning sulphur. Write the chemical reaction involved and identify the type of reaction.

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**57.** Why do fire flies glow at night?

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**58.** Grapes hanging on the plant do not ferment but after being plucked from the plant can be fermented. Under what conditions do these grapes ferment? Is it a chemical or a physical change?

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**59.** Which among the following are physical or chemical changes?

- (a) Evaporation of petrol
- (b) Burning of Liquefied Petroleum Gas (LPG)
- (c) Heating of an iron rod to red hot
- (d) Curdling of milk
- (e) Sublimation of solid ammonium chloride

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**60.** During the reaction of some metals with dilute hydrochloric acid, following observations were made.

- (a) Silver metal does not show any change
- (b) The temperature of the reaction mixture rises when aluminium (Al) is added
- (c) The reaction of sodium metal is found to be highly explosive
- (d) Some bubbles of a gas are seen when lead (Pb) is reacted with the acid

Explain these observations giving suitable reasons.

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**61.** A substance X, which is an oxide of a group 2 element, is used intensively in the cement industry. This element is present in bones also. On treatment with water it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.



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**62.** Write a balanced chemical equation for each of the following reactions and also classify them.

(a) Lead acetate solution is treated with dilute hydrochloric acid to form lead chloride and acetic acid solution.

(b) A piece of sodium metal is added to absolute ethanol to form sodium ethoxide and hydrogen gas.

(c) Iron (III) oxide on heating with carbon monoxide gas reacts to form solid iron and liberates carbon dioxide gas.

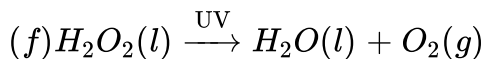
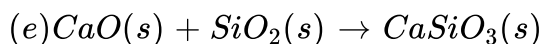
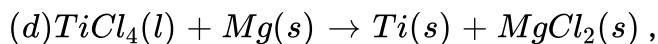
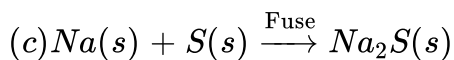
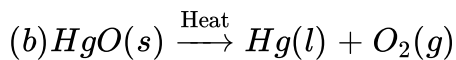
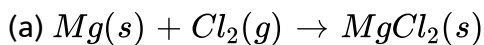
(d) Hydrogen sulphide gas reacts with oxygen gas to form solid sulphur and liquid water.

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63. Why do we store silver chloride in dark coloured bottles?

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64. Balance the following chemical equation and identify the type of chemical reaction.



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**65.** A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y.

(a) Write the chemical formulae of X and Y.

(b) Write a balanced chemical equation, when X is dissolved in water.

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**66.** Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid, whereas copper does not. Explain, why?

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

(a) Why do silver articles turn black when kept in the open for a few days?

Name the phenomenon involved.

(b) Name the black substance formed and give its chemical formula.

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## Long Answer Questions

1. (a) Why cannot a chemical change be normally reversed ?

(b) Why is it always essential to balance a chemical equation ?

(c) Why do diamond and graphite, the two allotropic forms of carbon evolve different amounts of heat on combustion ?

(d) Can rusting of iron take place in distilled water ?

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2. You are given the following materials :

(i) Iron nails

(ii) Copper sulphate solution

(iii) Barium chloride solution

(iv) Copper powder

(v) Ferrous sulphate crystals

(vi) Quick lime

Identify the type of chemical reaction taking place when :

- (a) Barium chloride solution is mixed with copper sulphate solution and a white precipitate is observed.
- (b) On heating, copper powder in air in a china dish, the surface of copper powder becomes black.
- (c) On heating green ferrous sulphate crystals, reddish brown solid is left and a gas having smell of burning sulphur is noticed.
- (d) Iron nails when left dipped in blue copper sulphate solution becomes brownish in colour and blue colour of copper sulphate solution fades away.



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**3.** A silver-white metal X taken in the form of ribbon, when ignited, burns in air with a dazzling white flame to form a white powder Y. When is added to powder Y, it dissolves partially to form another substance Z.

- (a) What could metal X be ?
- (b) What is powder Y ?
- (c) With which substance metal X combines to form powder Y ?
- (d) What is substance Z ? Name one domestic use of substance Z.



(e) Write a balanced chemical equation of the reaction which takes place when metal X burns in air to form powder Y.

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4. (i) Account for the following :

(a) White silver chloride turns grey in sunlight.

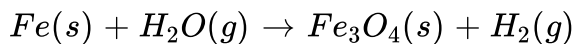
(b) Brown coloured copper powder on heating in air turns into black coloured substance.

(ii) What do you mean by

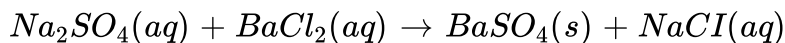
(a) Displacement reaction (b) Reduction reaction (c) Combination reaction ? Write balanced chemical equation.

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5. (a) Write the chemical equation in the balanced form.



(b) Identify the type of reaction from the equation given below :



(c) You could have noted that when copper powder is heated in a china dish, the surface of copper powder gets coated with black coloured substance.

(i) Why is this black coloured substance formed ? (ii) What is this black substance ?

(iii) Write the chemical equation of the reaction taking place.



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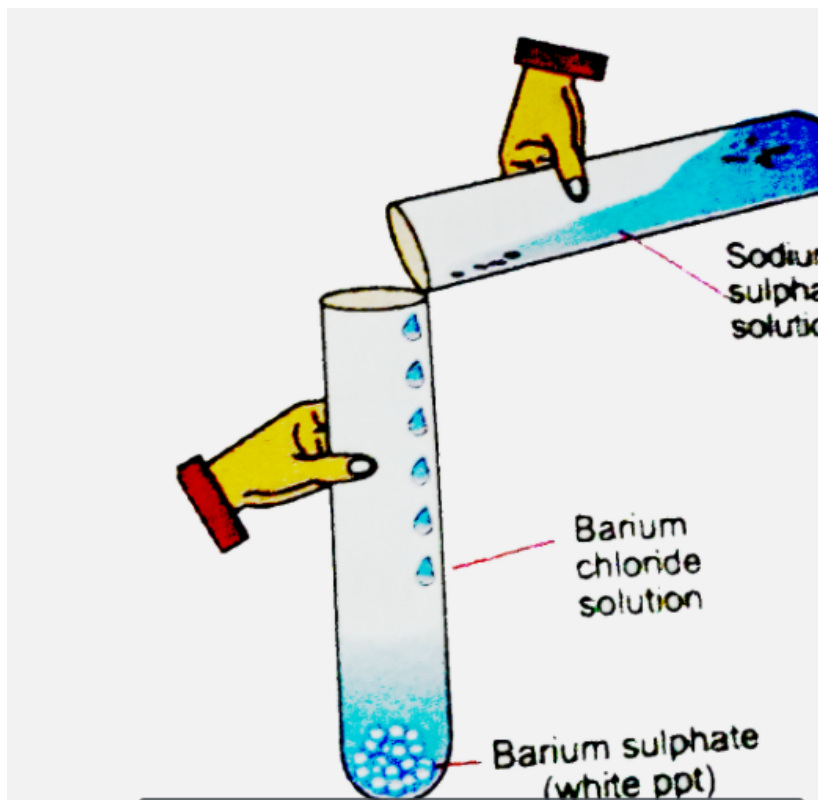
**6.** Observe the given figure and answer the following questions.

(a) Write the complete balanced reaction for the reaction that takes place.

(b) Type of reaction involved.

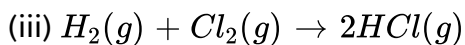
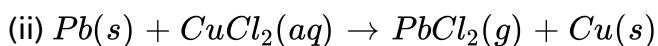
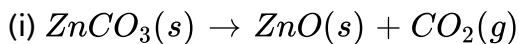
(c) Is there any precipitate formed.

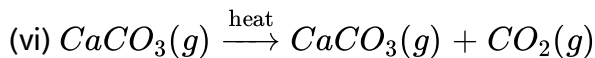
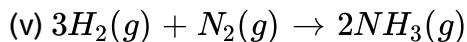
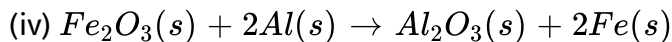
(d) If any precipitate formed, write the colour of the precipitate.



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7. Select (i) combination reactions (ii) decomposition reactions and displacement reactions from the following





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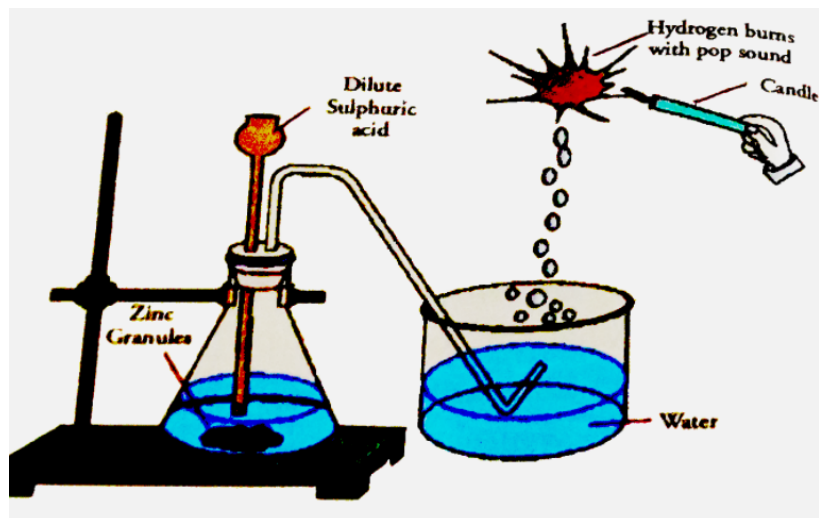
**8.** In the schematic diagram for the preparation of hydrogen gas as shown in figure, what would happen if following changes are made ?

(a) In place of zinc granules, same amount of zinc dust is taken in the test tube.

(b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.

(c) Sodium hydroxide is taken in place of dilute sulphuric acid and the

tube is heated.

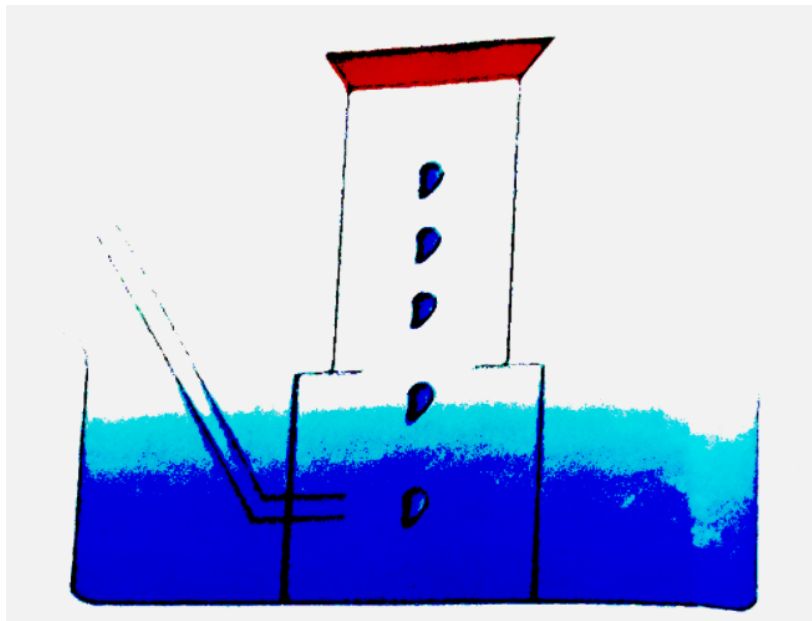


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9. A metal is treated with dil.  $H_2SO_4$ . The gas evolved is collected by the method shown in the figure. Answer the following :

- (i) Name the gas.
- (ii) Name the method of collection of the gas.
- (iii) Is the gas soluble or insoluble in water ?

(iv) Is the gas lighter or heavier than air ?



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**10.** A brown substance 'X' on heating in air forms a substance 'Y'. When hydrogen gas is passed over heated 'Y', it again changes back into 'X'.

(i) Name the substances X and Y.

(ii) Name the chemical processes occurring during both the changes.

(iii) Write the chemical equations.

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11. (a) The given diagram displays a chemical reaction. Observe carefully and answer the following questions :

(b) Identify the type of chemical reaction that will place and define it. How will the colour of the salt change ?

(c) Write the chemical equation of the reaction that takes place.

(d) Mention one commercial use of this salt.



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**12.** In the electrolysis of water :

(i) Name the gas collected at the cathode and anode respectively.

(ii) Why is the volume of one gas collected at one electrode double than that at the other ?

(iii) How will you test the evolved gases ?



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**13.** (a) Why is it necessary to balance a chemical equation ?

(b) Write the balanced chemical equations for the following reactions :

(i) Natural gas burns in air and combines with oxygen to form carbon dioxide and water.

(ii) During respiration, glucose combines with oxygen and forms carbon dioxide and water along with the release of energy.



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14. It has been found that marbles of Taj are getting corroded due to development of industrial areas around it. Explain this fact giving a chemical equation.

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15. (i) Solid calcium oxide was taken in a container and water was added slowly to it :

(a) Write the observation.

(b) Write the chemical formula of the product formed.

(ii) What happens when carbon dioxide gas is bubbled through lime water :

(a) in small amount (b) in excess.

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16. Identify the type of chemical reaction in the following statements and define each of them :

- (i) Digestion of food in our body
- (ii) Rusting of iron
- (iii) Heating of manganese dioxide with aluminium powder
- (iv) Blue colour of copper sulphate solution disappears when iron filings are added to it.
- (v) Dilute hydrochloric acid is added to sodium hydroxide solution to form sodium chloride and water.



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**17.** 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.



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**18.** (a) List two observations that are noticed when an iron nail is put inside copper sulphate solution. Write chemical equation for the reaction that occurs.

(b) Explain two ways by which rancidity of food materials can be checked.



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**19.** You are given the following materials

(i) Marble chips (ii) Dilute hydrochloric acid (iii) Zinc granules

Identify the type of reaction when marble chips and zinc granules are added separately to acid taken in tubes. Write chemical equations in each case.



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**20.** On adding a drop of barium chloride solution to an aqueous solution of sodium sulphite, white precipitate is obtained :

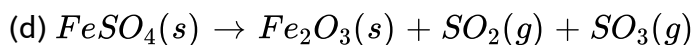
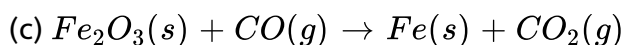
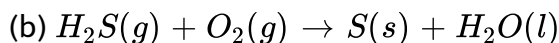
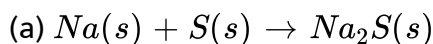
(a) Write a balanced chemical equation for the reaction involved.

(b) What other name can be given to this precipitation reaction

(c) On adding dilute hydrochloric acid to the reaction mixture, white precipitate disappears. Why ?

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21. Balance the following chemical equations and identify the type of reaction involved :



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22. (a) Explain why : respiration is an exothermic reaction

(b) A colourless lead salt when heated produces a yellow residue and brown fumes. (i) Name the lead salt (ii) Name the yellow residue and brown fumes (iii) What the chemical equation for the reaction involved ?

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23. (a) Explain the term "rancidity". What damage is caused by rancidity ?
- (b) What type of chemical reaction is responsible for causing rancidity ?
- (c) State and explain the various methods for preventing or regarding rancidity of food.

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24. (a) Why are decomposition reactions called the opposite of combination reactions ? Explain with equations of these reactions.

(b) Express the following facts in the form of a balanced chemical equation:

"When a strip of copper metal is placed in a solution of silver nitrate, metallic silver is precipitated and a solution containing copper nitrate is formed"

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25. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (Black), oxygen gas and a brown gas X is formed

- (a) Write a balanced chemical equation of the reaction.
- (b) Identify the brown gas X evolved.
- (c) Identify the type of reaction.
- (d) What could be the pH range of aqueous solution of the gas X ?

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26. Give the characteristic tests for the following gases : (a)  $CO_2$  (b)  $SO_2$   
(c)  $O_2$  (d)  $H_2$

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27. What happens when piece of

- (a) zinc metal is added to copper sulphate solution ?
- (b) aluminium metal is added to dilute hydrochloric acid ?

(c) silver metal is added to copper sulphate solution ?

Also write the balanced chemical equation if the reaction occurs.

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**28.** What happens when zinc granules are treated with dilute solution of  $H_2SO_4$ ,  $HCl$ ,  $HNO_3$ ,  $NaCl$  and  $NaOH$  ? Also write the chemical equations if reaction occurs.

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**29.** On adding a drop of barium chloride solution to an aqueous solution of sodium sulphite, white precipitate is obtained :

(a) Write a balanced chemical equation for the reaction involved.

(b) What other name can be given to this precipitation reaction

(c) On adding dilute hydrochloric acid to the reaction mixture, white precipitate disappears. Why ?

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30. You are provided with two containers made up of copper and aluminium.

You are also provided with solutions of dilute HCl, dilute  $HNO_3$ ,  $ZnCl_2$  and  $H_2O$ . In which of the containers these solutions can be kept?

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### Higher Order Thinking Skill Based Questions

1. Study the given diagram and answer the following questions :

(a) Write the chemical reaction involved in the process.

(b) Mention the colour of :

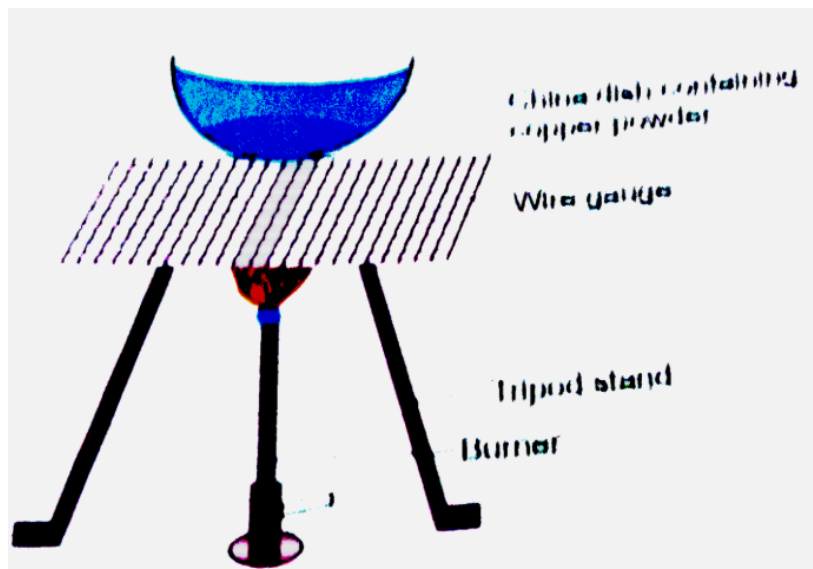
(i) Copper powder and

(ii) the substance formed after heating it.

(c) How can we reverse the above reaction ? Write the equation for the reverse reaction and state the substance that under-goes oxidation and



the substance that undergoes reduction.



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2. The gases hydrogen and chlorine donot react with each other even if kept together for a long time. However, in the presence of sun light, they readily combine. What does actually happen ?

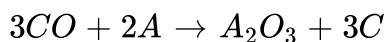
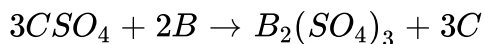
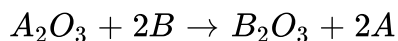
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3. A water insoluble substance 'X' on reacting with dilute  $H_2SO_4$  released a colourless and odourless gas accompanied by brisk effervescence. When the gas was passed through water, the solution obtained turned blue litmus red. On bubbling the gas through lime water, it initially became milky and the milky appearance disappeared when the gas was passed in excess. Identify the substance 'X' and write the chemical equations of the reactions involved.



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4. A, B and C are three elements which undergo chemical reactions according to following equations.



Answer the following questions :

(a) Which element is the most reactive ? (b) Which element is the least reactive ?



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5. You are given the following materials

(i) Marble chips (ii) Dilute hydrochloric acid (iii) Zinc granules

Identify the type of reaction when marble chips and zinc granules are added separately to acid taken in tubes. Write chemical equations in each case.



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6. A strip of metal X is dipped in the blue coloured salt solution  $YSO_4$ . After some time, a layer of metal Y from the salt solution is formed on the surface of metal strip X. Metal X is used in galvanisation whereas metal Y is used in making electric wires. Metal X and metal Y together form an alloy Z.

(a) What could metal X be.

(b) What could metal Y be ?

(c) Name the metal salt  $YSO_4$ .

(d) What type of chemical reaction takes place when metal X reacts with salt solution  $YSO_4$  ? Write the equation of the chemical reaction involved.

(e) Name the alloy Z.

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7. Two metals X and Y form the salts  $XSO_4$  and  $Y_2SO_4$  respectively. The solution of salt  $XSO_4$  is blue in colour whereas that of  $Y_2SO_4$  is formed alongwith a salt which turns the solution green. And when barium chloride solution is added to  $Y_2SO_4$  solution, then the same white precipitate Z is formed alongwith colourless common salt solution.

(a) What could the metal X and Y be ?

(b) Write the name and formula of salt  $XSO_4$

(c) Write the name and formula of salt  $Y_2SO_4$

(d) What is the name and formula of white precipitate Z ?

(e) Write the name and formula of the salt which turns the solution green in the first case.

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## Multiple Choice Questions

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

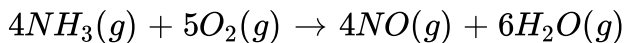
- A. Boiling of water to give water vapours
- B. Melting of ice to give water
- C. Dissolution of salt in water
- D. Combustion of Liquefied Petroleum Gas (LPG)

**Answer: D**



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2. The following reaction is an example of a



- (i) displacement reaction
- (ii) combination reaction

(iii) redox reaction

(iv) neutralisation reaction

A. (i) and (iv)

B. (ii) and (iii)

C. (i) and (iii)

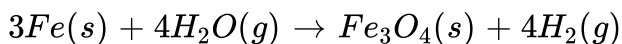
D. (iii) and (iv)

**Answer: C**



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



1. Iron metal is getting oxidised.
2. Water is getting reduced.
3. Water is acting as reducing agent.
4. Water is acting as oxidising agent.

A. (i), (ii) and (iii)

B. (iii) and (iv)

C. (i), (ii) and (iv)

D. (ii) and (iv)

**Answer: C**



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**4. Which of the following are exothermic processes?**

1. Reaction of water with quick lime

2. Dilution of an acid

3. Evaporation of water

4. Sublimation of camphor (crystals)

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (iii) and (iv)

**Answer: A**



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5. Three beakers labelled as  $A$ ,  $B$  and  $C$  each containing 25 mL of water were taken. A small amount of  $NaOH$ , anhydrous  $CuSO_4$  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) and (iv)

D. (ii) and (iii)

**Answer: C**



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6. 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.  $KMnO_4$  is an oxidising agent and it oxidises  $FeSO_4$

B.  $FeSO_4$  acts as an oxidising agent and it oxidises  $KMnO_4$

C. The colour disappears due to dilution, no reaction is involved

D.  $KMnO_4$  is an unstable compound and decomposes in presence of

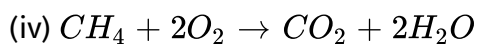
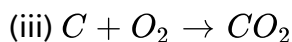
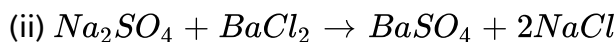
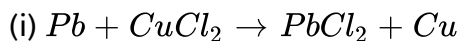
$FeSO_4$  to a colourless compound.

**Answer: A**



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



A. (i) and (iv)

B. (ii) only

C. (i) and (ii)

D. (iii) and (iv)

**Answer: B**



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8. Which among the following statement (s) is /are true? Exposure 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) and (iii)

C. (ii) and (iii)

D. (iv) only

**Answer: A**



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9. 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 true about slaking of lime and the solution formed?

- (i) It is an endothermic reaction.
- (ii) It is exothermic reaction.
- (iii) The pH of the resulting solution will be more than seven.
- (iv) The pH of the resulting solution will be less than seven.

- A. (i) and (ii)
- B. (ii) and (iii)
- C. (i) and (iv)
- D. (iii) and (iv)

**Answer: B**



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**10.** 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) and (iv)

**Answer: D**



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**11.** 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

**Answer: B**



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**12. 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) and (iii)

B. (ii) only

C. (iii) only

D. (ii) and (iv)

**Answer: D**



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**13.** 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

**Answer: B**



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

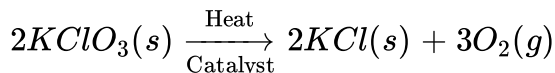
- A. Carbon dioxide or oxygen
- B. Nitrogen or oxygen
- C. Carbon dioxide or helium
- D. Helium or nitrogen

**Answer: D**



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



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

- A. It is a decomposition reaction and is endothermic in nature



B. It is a combination reaction

C. It is a decomposition reaction and is accompanied by release of heat

D. It is a photochemical decomposition reaction and exothermic in nature

**Answer: A**



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**16.** Which one of the following processes involve chemical reactions?

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

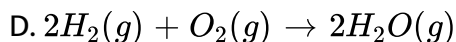
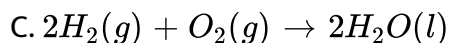
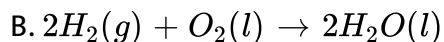
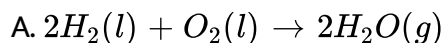
D. Heating copper wire in the presence of air at high temperature.

**Answer: D**



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

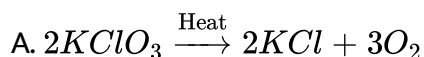


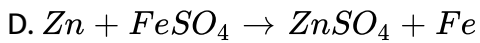
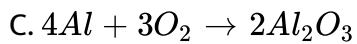
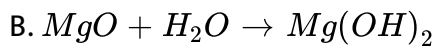
Answer: D



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18. Which of the following is a displacement reaction ?





**Answer: D**



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