

GRADE 10 CHEMISTRY

CHEMICAL REACTIONS AND EQUATIONS

QUESTION BANK

1. Which of the following reactions is an exothermic reaction ?
- (a) Burning of coal.
 - (b) Decomposition of vegetable matter into compost.
 - (c) Process of respiration.
 - (d) Decomposition of calcium carbonate to form quick lime and carbon dioxide.

Ans: (d)

2. Burning of the candle is a _____ change.
- (a) physical
 - (b) chemical
 - (c) both (a) and (b)
 - (d) none of these

Ans: (c)

3. $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \underline{\hspace{2cm}}$.
- (a) H_2
 - (b) Cl_2
 - (c) Zn
 - (d) None of these

Ans(a)

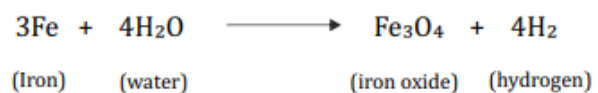
4. Which of the following reaction is not feasible?
- (a) Aluminium + Copper sulphate
 - (b) Zinc + Copper sulphate solution
 - (c) Iron + Zinc sulphate solution
 - (d) Copper + Zinc sulphate

Ans: (d)

5. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified potassium permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation ?
- (a) KMnO_4 is an oxidising agent, it oxidises FeSO_4 .
 - (b) FeSO_4 acts as an oxidising agent and 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.

Ans: (a)

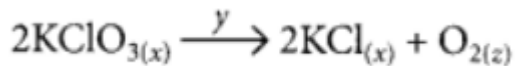
6. When steam is passed through red hot iron, iron oxide and hydrogen gas is formed. The balanced equation for the reaction is shown below.



Is heating iron to red hot a physical or a chemical change? Explain your answer

Ans: Physical change. When iron is heated it will get red colour but there is no change in its chemical form so it is not a chemical change, it is only a physical change

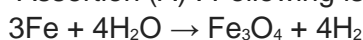
7. Identify 'x', 'y' and 'z' in the following reaction :



- (a) x = gas; y = reaction condition; z = gas
(b) x = solid; y = liquid; z = gas
(c) x = number of moles of KClO_3 ; y = reaction condition; z = number of molecules of oxygen
(d) x = physical state of KClO_3 and KCl , y = reaction condition, z = physical state of O_2

Ans: (d)

8. Assertion (A) : Following is a balanced chemical equation for the action of steam on iron :



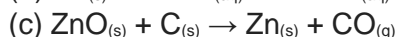
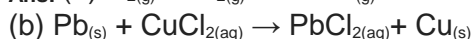
Reason (R): The law of conservation of mass holds good for a chemical equation.

- (a) Both (A) and (R) are true and reason (R) is the correct explanation of the assertion (A)
(b) Both (A) and (R) are true, but reason (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

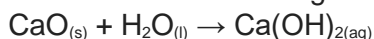
Ans: (a)

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

- (a) Hydrogen + Chlorine \rightarrow Hydrogen chloride
(b) Lead + Copper chloride \rightarrow Lead chloride + Copper
(c) Zinc oxide + Carbon \rightarrow Zinc + Carbon monoxide



10. Calcium oxide reacts vigorously with water to produce slaked lime.



This reaction can be classified as

- (A) Combination reaction
(B) Exothermic reaction
(C) Endothermic reaction
(D) Oxidation reaction

Which of the following is a correct option?

- (a) (A) and (C)
(b) (C) and (D)
(c) (A), (C) and (D)
(d) (A) and (B)

Ans: (d)

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

- (A) exchange of atoms takes place
(B) exchange of ions takes place
(C) a precipitate is produced
(D) an insoluble salt is produced

The correct option is

- (a) (B) and (D)

- (b) (A) and (C)
- (c) only (B)
- (d) (B), (C) and (D)

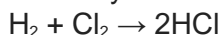
Ans: (d)

12. In which of the following, the identity of initial substance remains unchanged?

- (a) Curdling of milk
- (b) Formation of crystals by process of crystallisation
- (c) Fermentation of grapes
- (d) Digestion of food

Ans: (b)

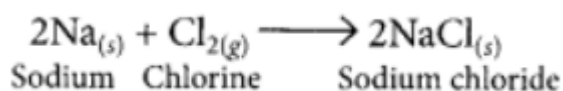
13. Study the following equation of a chemical reaction:



- (i) Identify the type of reaction.
- (ii) Write a balanced chemical equation of another example of this type of reaction.

Ans: (i) Combination reaction.

(ii) Another example of combination reaction is



14. State the type of chemical reactions, represented by the following equations

- (a) $\text{A} + \text{BC} \rightarrow \text{AC} + \text{B}$
- (b) $\text{A} + \text{B} \rightarrow \text{C}$
- (c) $\text{PQ} + \text{RS} \rightarrow \text{PS} + \text{RQ}$
- (d) $\text{A}_2\text{O}_3 + 2\text{B} \rightarrow \text{B}_2\text{O}_3 + 2\text{A}$

Ans: (a) Displacement reaction.

(b) Combination reaction.

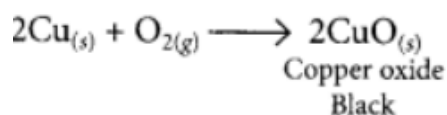
(c) Double displacement reaction.

(d) Displacement reaction or redox reaction.

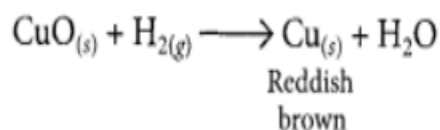
15. 1 g of copper powder was taken in a China dish and heated. What change takes place on heating?

When hydrogen gas is passed over this heated substance, a visible change is seen in it. Give the chemical equations of reactions, the name and the colour of the products formed in each case.

Ans: When copper powder is heated in a China dish, the reddish brown surface of copper powder becomes coated with a black substance which is copper oxide.



When hydrogen gas is passed over CuO, the black coating on the surface turned reddish brown due to the formation of Cu.



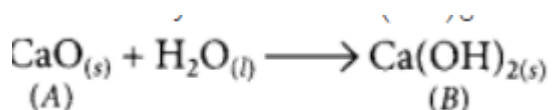
16. A compound 'A' is used in the manufacture of cement. When dissolved in water, it evolves a large

amount of heat and forms compound 'B'.

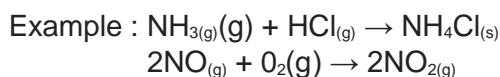
- Identify A and B.
- Write chemical equation for the reaction of A with water.
- List two types of reaction in which this reaction may be classified

Ans: (i) A is calcium oxide, CaO which is used in the manufacturing of cement.

B is calcium hydroxide Ca(OH)₂



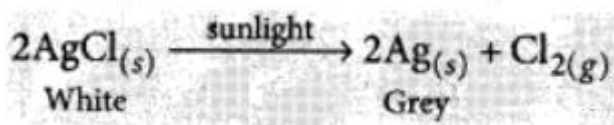
- The given reaction is a combination reaction.



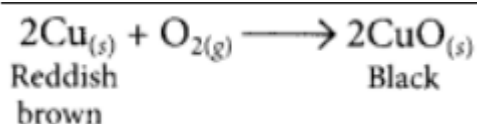
17. Mention with reason the colour changes observe when:

- silver chloride is exposed to sunlight.
- copper powder is strongly heated in the presence of oxygen.
- a piece of zinc is dropped in copper sulphate solution.

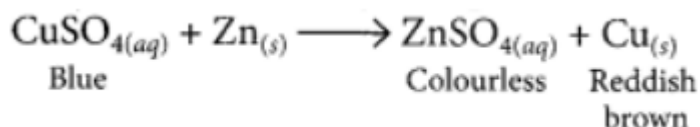
Ans: (i) When white silver chloride is left exposed to sunlight, its colour changes to grey as it decomposes to silver in the presence of sunlight



ii) When copper powder is strongly heated in presence of oxygen, the reddish brown surface of copper powder becomes coated with a black substance which is copper oxide.



(iii) When a piece of zinc is dropped in copper sulphate solution, then the blue colour of copper sulphate fades gradually due to the formation of colourless zinc sulphate solution and reddish brown copper metal gets deposited on zinc piece



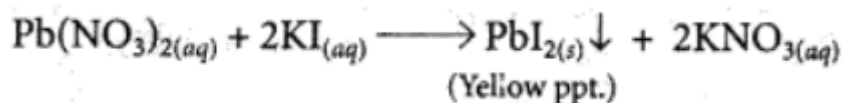
18. Lead nitrate solution is added to a test tube containing potassium iodide solution.

- Write the name and colour of the compound precipitated.
- Write the balanced chemical equation for the reaction involved.
- Name the type of this reaction justifying your answer

Ans: (a) When lead nitrate is added to potassium iodide then yellow precipitate of lead iodide is formed

along with potassium nitrate.

(b) Balanced chemical reaction is as follows :



(c) This type of reaction is called precipitation reaction in which one of the products formed is an insoluble substance or this is also called double displacement reaction.

19. 2 g of ferrous sulphate crystals are heated in a dry boiling tube

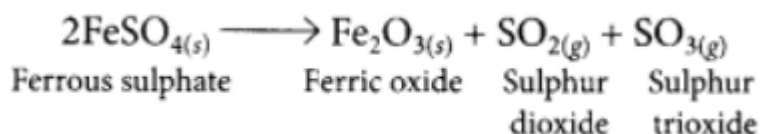
(a) List any two observations.

(b) Name the type of chemical reaction taking place.

(c) Write balanced chemical equation for the reaction and name the products formed.

Ans: (a) Ferrous sulphate crystals ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3) with a smell of burning sulphur.

(b) This is a thermal decomposition reaction.



20. You might have noted that when copper powder is heated in a China dish, the reddish brown surface of copper powder becomes coated with a black substance.

(a) Why has this black substance formed?

(b) What is the black substance?

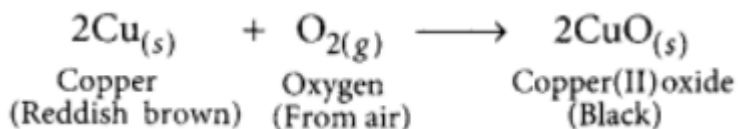
(c) Write the chemical equation of the reaction that takes place.

(d) How can the black coating on the surface be turned reddish brown?

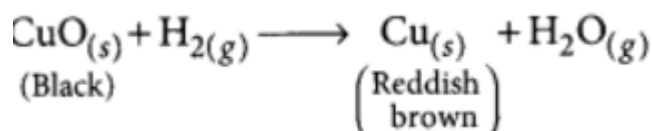
Ans: (a) The black substance is formed because copper combines with oxygen.

(b) The black substance is copper oxide (CuO).

(c)

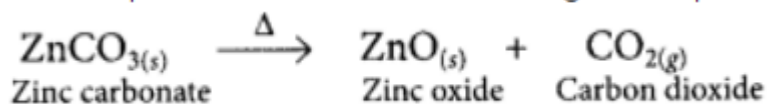


(e) The black coating on the surface can be turned reddish brown by passing hydrogen gas over the hot copper oxide.

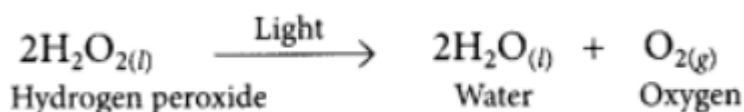


21. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity.

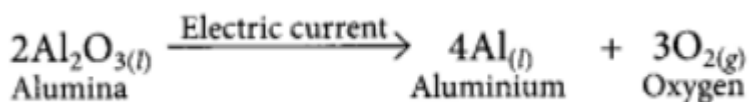
Ans: Decomposition reaction involving absorption of heat



Decomposition reaction involving absorption of light



Decomposition reaction involving absorption of electrical energy:



22. Take 3 g of barium hydroxide in a test tube, now add about 2 g of ammonium chloride and mix the contents with the help of a glass rod. Now touch the test tube from outside.

- (i) What do you feel on touching the test tube?
- (ii) State the inference about the type of reaction occurred.
- (iii) Write the balanced chemical equation of the reaction involved

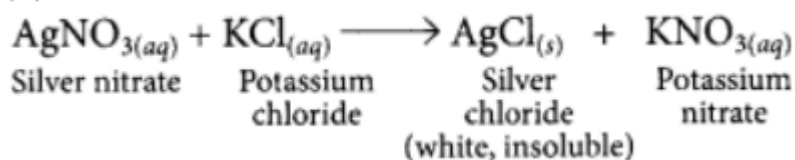
Ans: (i) When barium hydroxide is added into ammonium chloride, the bottom of test tube is found to be cooler.

(ii) It is an endothermic reaction.

(iii) $\text{Ba}(\text{OH})_2 + 2\text{NH}_4\text{Cl} \rightarrow \text{BaCl}_2 + 2\text{NH}_4\text{OH}$

23. 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.

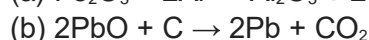
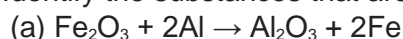
Ans:



It is a double displacement reaction.

23. What is a reduction reaction?

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



Ans:

Those reactions in which addition of hydrogen to a substance or removal of oxygen from a substance

take place are called reduction reactions.

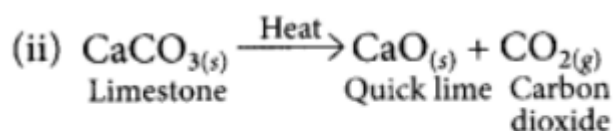
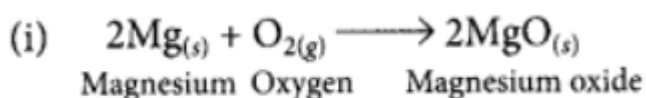
- (a) Fe_2O_3 is getting reduced to Fe and Al is getting oxidised to Al_2O_3 .
(b) PbO is reduced to Pb and C is oxidised to CO_2 .

24. Mention the type of chemical reaction that takes place when

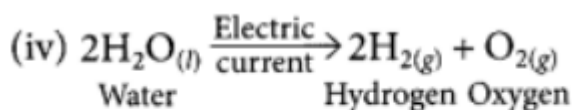
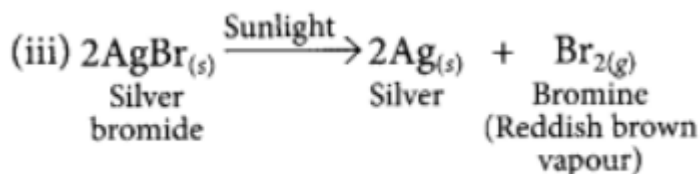
- (i) a magnesium ribbon is burnt in air.
(ii) limestone is heated.
(iii) silver bromide is exposed to sunlight.
(iv) electricity is passed through acidified water.
(v) ammonia and hydrogen chloride are mixed with each other.

Write the chemical equation for each reaction

Ans:



This is a thermal decomposition reaction.



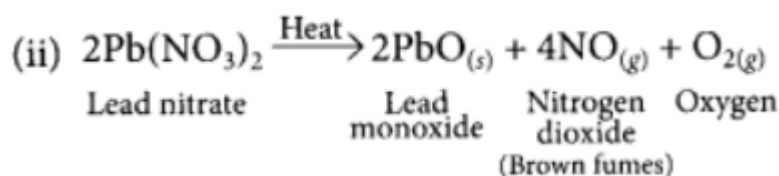
This is electrolytic decomposition reaction.



This is a combination reaction.

- 25.(i) Why is respiration considered as an exothermic reaction?
 (ii) Write chemical name and the formula of the brown gas produced during thermal decomposition of lead nitrate.
 (iii) Why do chips manufactures flush bags of chips with gas such as nitrogen?

Ans: (i) The glucose produced in our body during digestion combines with oxygen in the cells of our body and provides energy. The special name of this reaction is respiration. Thus respiration is an exothermic process because energy is produced during this process.



Brown gas evolved is nitrogen dioxide (NO₂).

(iii) Chips manufacturers usually flush bags of chips with gas such as nitrogen because atmospheric oxygen can react with chips which may cause change in colour, change in taste. So to cut the contact between air and the chips, nitrogen gas is used which do prevent its oxidation.

26. Name the reducing agent in the following reaction:



State which is more reactive, Mn or Al and why?

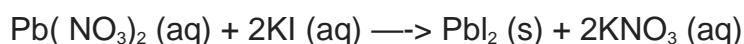
Ans. 'Al' is reducing agent.

Al is more reactive than Mn v 'Al' displaces Mn from its oxide.

27. What is observed when a solution of potassium iodide solution is added to a solution of lead nitrate?

Name the type of reaction. Write a balanced chemical equation to represent the above chemical reaction.

Ans: . Yellow precipitate of lead iodide is formed. It is precipitation reaction.

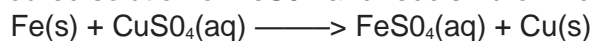


It is also called double displacement reaction.

28. Why does the colour of copper sulphate solution change when an iron nail is dipped in it? Write two observations.

Ans.: It is because displacement reaction takes place.

Iron displaces copper from copper sulphate solution and forms pale green coloured solution of FeSO₄ and reddish brown copper metal gets deposited.



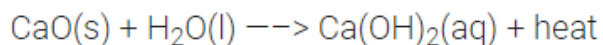
29. (a) A solution of substance 'X' is used for white washing. What is the substance 'X'? State the chemical

reaction of 'X' with water.

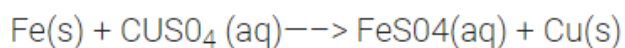
(b) Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

Ans:

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(a) 'X' is calcium oxide (CaO).



(a) It is because iron displaces copper from CuSO_4 to form FeSO_4 which is pale green.



Blue Pale green

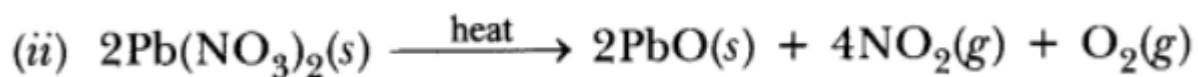
30. A white salt on heating decomposes to give brown fumes and a residue is left behind.

(i) Name the salt.

(ii) Write the equation for the decomposition reaction.

Ans.

(i) Lead nitrate is white salt.



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