

SBG STUDY

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CHAPTER - 1

CHEMICAL REACTION AND EQUATION

Atomic Number	Name of an element	Symbol	Electronic Configuration				Valency
			K	L	M	N	
1.	Hydrogen	H	1				1
2.	Helium	He	2				0
3.	Lithium	Li	2	1			1
4.	Berillium	Be	2	2			2
5.	Boron	B	2	3			3
6.	Carbon	C	2	4			4
7.	Nitrogen	N	2	5			3
8.	Oxygen	O	2	6			2
9.	Fluorine	F	2	7			1
10.	Neon	Ne	2	8			0
11.	Sodium	Na	2	8	1		1
12.	Magnesium	Mg	2	8	2		2
13.	Aluminium	Al	2	8	3		3
14.	Silicon	Si	2	8	4		4
15.	Phosphorus	P	2	8	5		3
16.	Sulphur	S	2	8	6		2
17.	Chlorine	Cl	2	8	7		1
18.	Argon	Ar	2	8	8		0
19.	Potassium	K	2	8	8	1	1
20.	Calcium	Ca	2	8	8	2	2

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The process by which one or more substances transform into new substances is called chemical reaction.

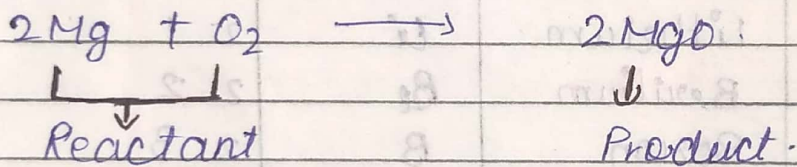
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The substances which take part in chemical reaction are called reactants.

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The substances which are formed during chemical reaction are called Products.

eg :-



characteristics of chemical Reaction:-

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The change in colour is an important identification of the chemical reaction.

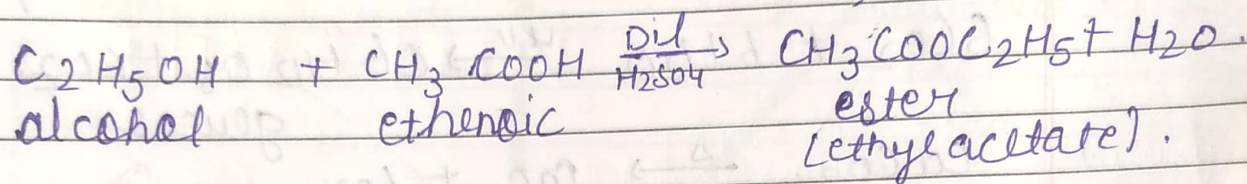
eg. when (Cu) copper sulphate react with iron then Blue colour of copper sulphate change to greenish of iron sulphate solution.

eg. $\text{CuSO}_4 (\text{aq.}) + \text{Fe}(\text{s}) \longrightarrow \text{FeSO}_4 (\text{aq.}) + \text{Cu}(\text{s})$
 Blue in colour. greenish
 Copper Sulphate iron sulphate

2. change in order :-

some chemical reactions accompany change in smell.

eg. The reaction b/w alcohol & ethanoic acid in presence of mineral acid (sulphuric acid H_2SO_4) gives the fruit smell.

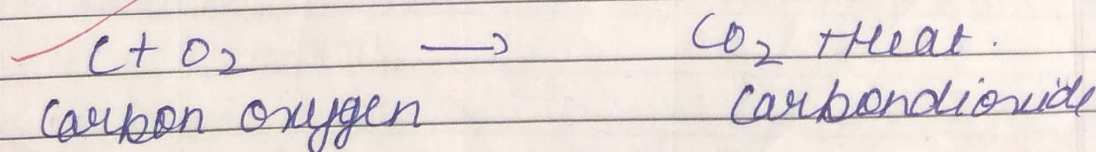
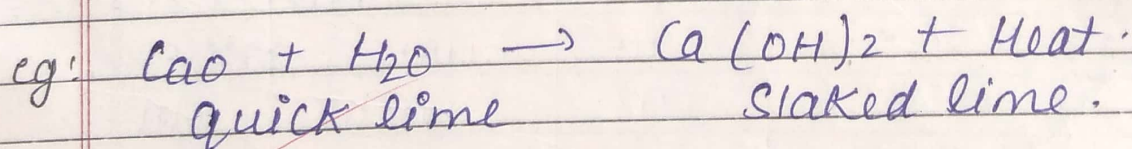


3. change in temperature

During a chemical change the heat will either be absorbed or released. It means the chemical reaction may be exothermic and endothermic.

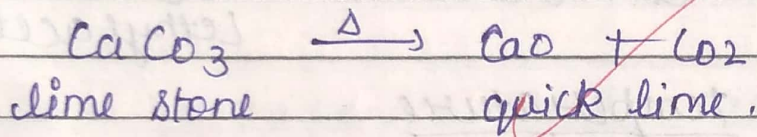
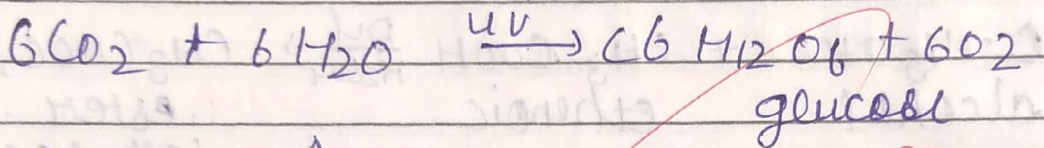
Exothermic Reactions :

Those reaction in which heat is released are called exothermic reaction due to release of heat temp. of reaction mixture increases and container becomes hot.



Endothermic Reaction:

Those reaction in which heat energy is absorb are called endothermic react. when chemical reaction absorb that heat then temp. of reaction of mixture falls down.

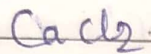
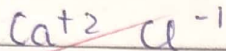


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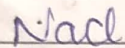
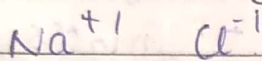
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Formulas.

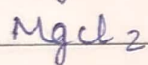
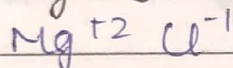
1. Calcium chloride



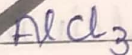
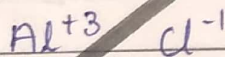
2. Sodium chloride



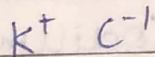
3. Magnesium chloride



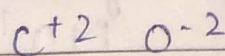
4. Aluminium chloride



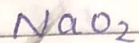
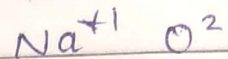
5. Potassium chloride



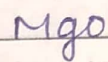
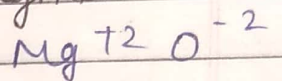
6. Calcium oxide



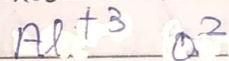
7. Sodium oxide



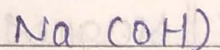
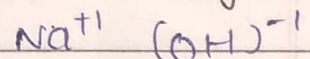
8. Magnesium oxide



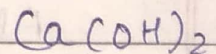
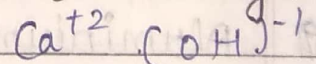
9. Aluminium oxide



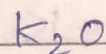
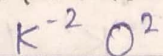
10. Sodium Hydroxide



11. Calcium Hydroxide



12. Potassium oxide



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Formulae

1. Sodium chloride
 NaCl

2. Magnesium chloride
 MgCl_2

3. Aluminium chloride
 AlCl_3

4. Potassium chloride
 KCl

5. Calcium chloride
 CaCl_2

Hydroxide, Nitrate
 $(\text{OH})^{-1}$, $(\text{NO}_3)^{-1}$

1. Sodium hydroxide
 NaOH

2. Magnesium hydroxide
 $\text{Mg}(\text{OH})_2$

3. Aluminium Hydroxide
 $\text{Al}(\text{OH})_3$

4. Potassium Hydroxide
 KOH

1. Sodium oxide
 Na_2O

2. Magnesium oxide
 MgO

3. Aluminium oxide
 Al_2O_3

4. Potassium oxide
 K_2O

5. Calcium oxide
 CaO

Sulphate, Carbonate
 $(\text{SO}_4)^{-2}$, $(\text{CO}_3)^{-2}$

1. Sodium Nitrate
 $\text{Na}(\text{NO}_3)$

2. Magnesium Nitrate
 $\text{Mg}(\text{NO}_3)_2$

3. Aluminium Nitrate
 $\text{Al}(\text{NO}_3)_3$

4. Potassium Nitrate
 KNO_3

5. Calcium Hydroxide
 Ca(OH)_2

5. Calcium Nitrate
 $\text{Ca(NO}_3)_2$

1. Sodium Nitrate
 NaNO_3

1. Sodium Carbonate
 Na_2CO_3

2. Magnesium Sulphate
 MgSO_4

2. Magnesium Carbonate
 MgCO_3

3. Aluminium Sulphate
 $\text{Al}_2(\text{SO}_4)_3$

3. Aluminium Carbonate
 $\text{Al}_2(\text{CO}_3)_3$

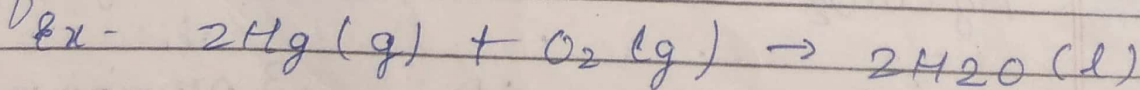
4. Potassium Sulphate
 K_2SO_4

4. Potassium carbonate
 K_2CO_3

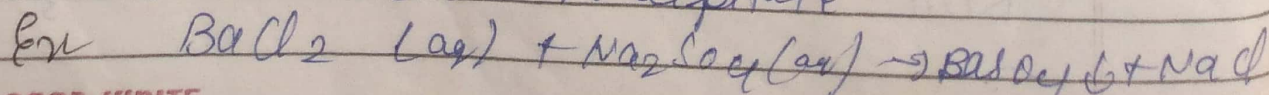
5. Calcium sulphate
 CaSO_4

5. Calcium carbonate
 CaCO_3

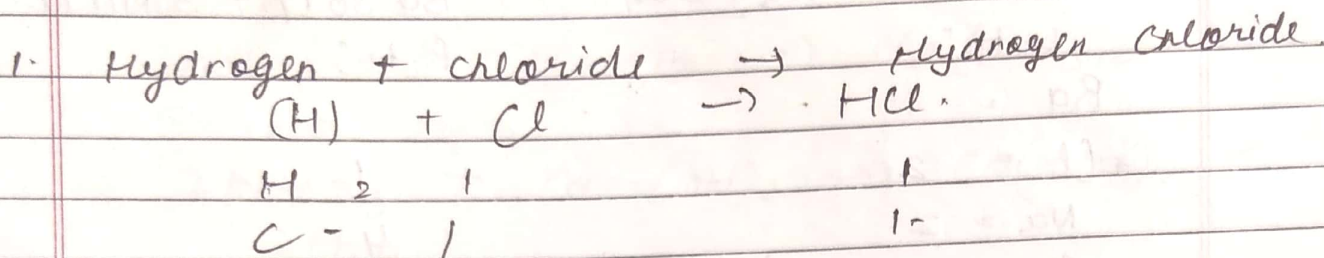
Change in physical state: During some chemical reaction the physical state of product become different from that of reactants.



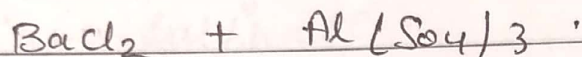
Formation of Precipitate: - Some reaction in which solid products are formed these products are called precipitate & the reaction is called precipitation.



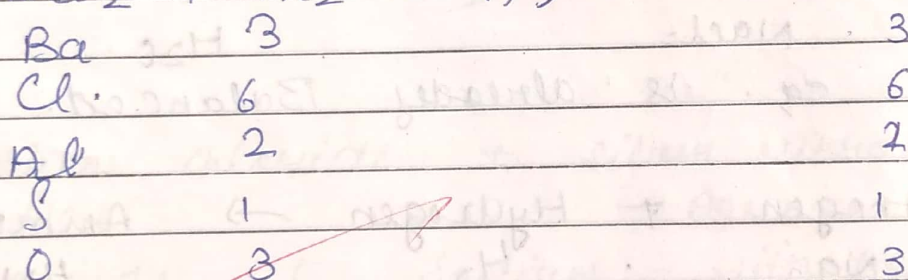
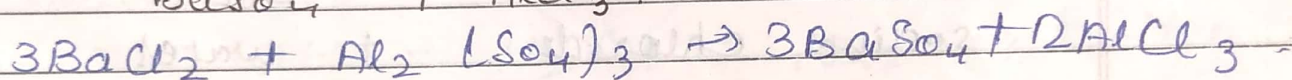
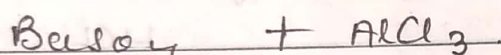
Balance the chemical equation.



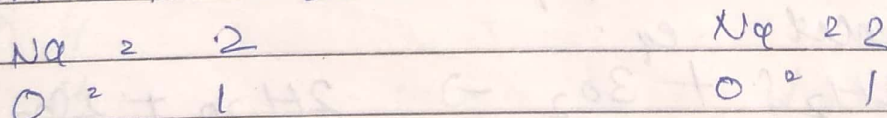
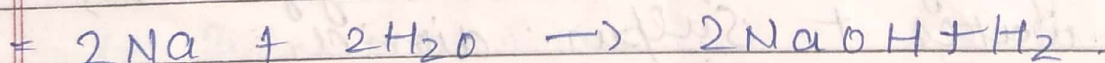
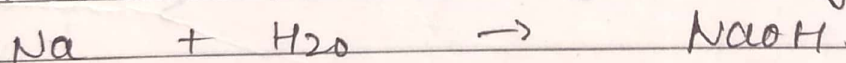
2. Barium chloride + Aluminium Sulphate.



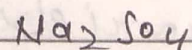
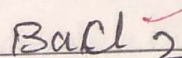
Barium sulphate + Aluminium chloride.



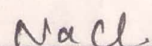
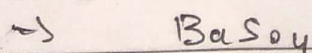
3. Sodium + water $\rightarrow$ Sodium Hydroxide.



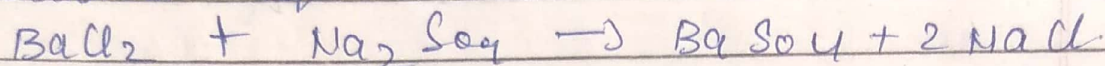
4. Barium Chloride + Sodium sulphate. $\rightarrow$



$\rightarrow$ Barium sulphate + Sodium chloride

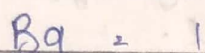


Balanced eq.



L.H.S

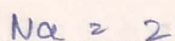
R.H.S



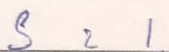
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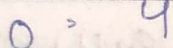
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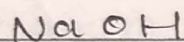


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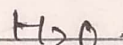
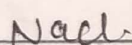


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5. Sodium Hydroxide + Hydrochloric acid $\rightarrow$

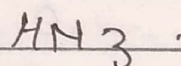
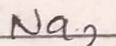


sodium chloride + water

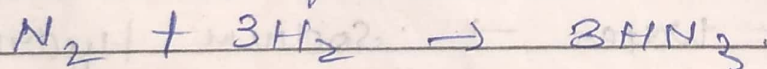


The eq. is already Balanced.

6. Nitrogen + Hydrogen $\rightarrow$ Ammonia



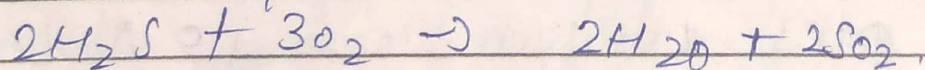
Balanced eq.



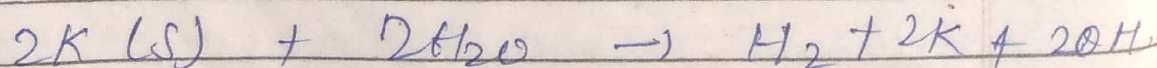
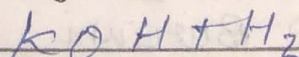
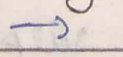
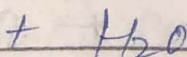
7. Hydrogen Sulphate + Oxygen $\rightarrow$

Water + Sulphur dioxide

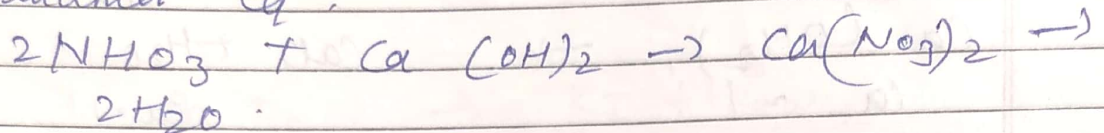
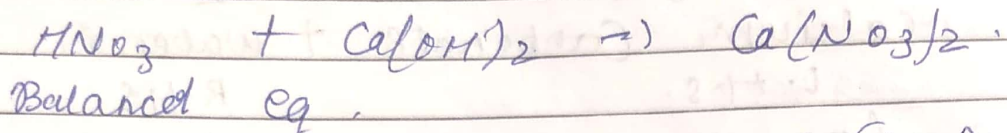
Balanced eq.



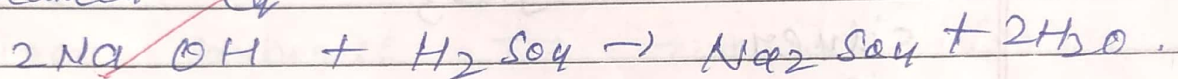
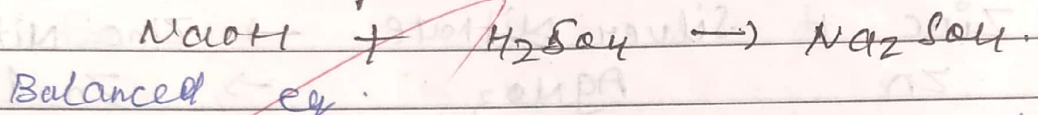
8. Potassium + water $\rightarrow$ Potassium Hydroxide + Hydrogen



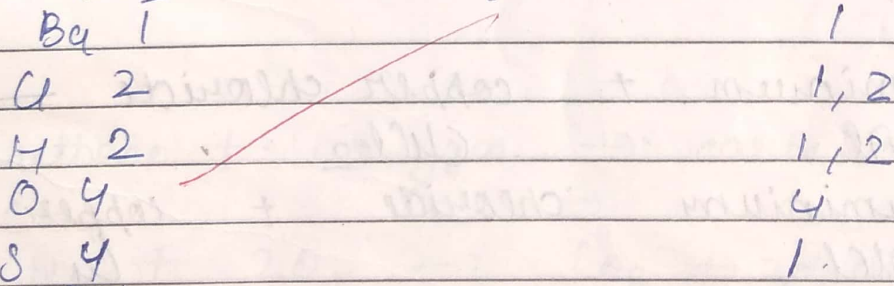
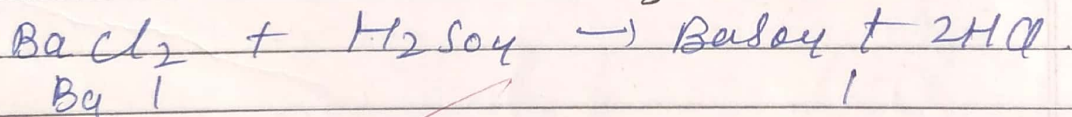
9. Nitric acid + Slaked lime $\rightarrow$ Calcium nitrate + water.



10. Sodium hydroxide + Sulphuric acid $\rightarrow$ Sodium Sulphate.

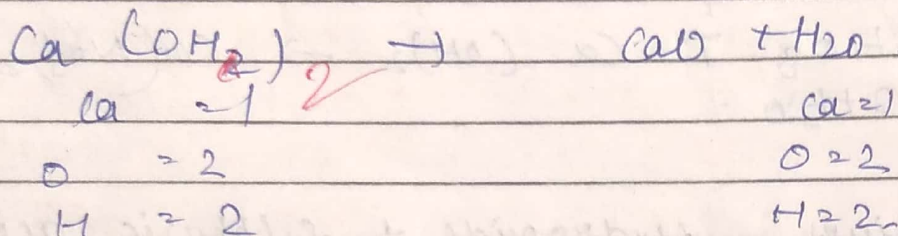


11. Sodium chloride + Silver Nitrate $\rightarrow$ Silver chloride + Sodium Nitrate.

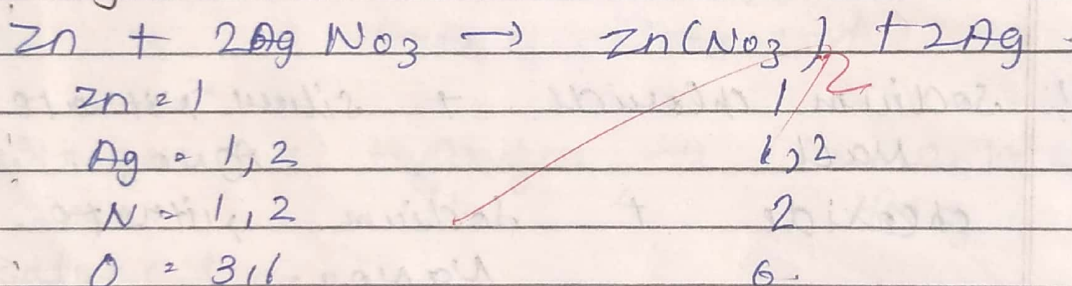


12. Barium chloride + Sulphuric acid $\rightarrow$ Barium Sulphate + HCl

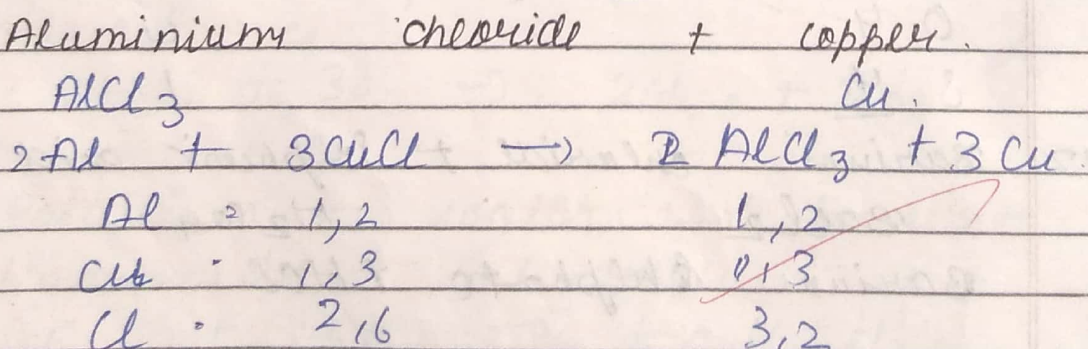
13. Calcium hydroxide + Carbon dioxide $\rightarrow$
 $\text{Ca}(\text{OH})_2$ CO_2
 Calcium Carbonate + water
 L.H.S. R.H.S.

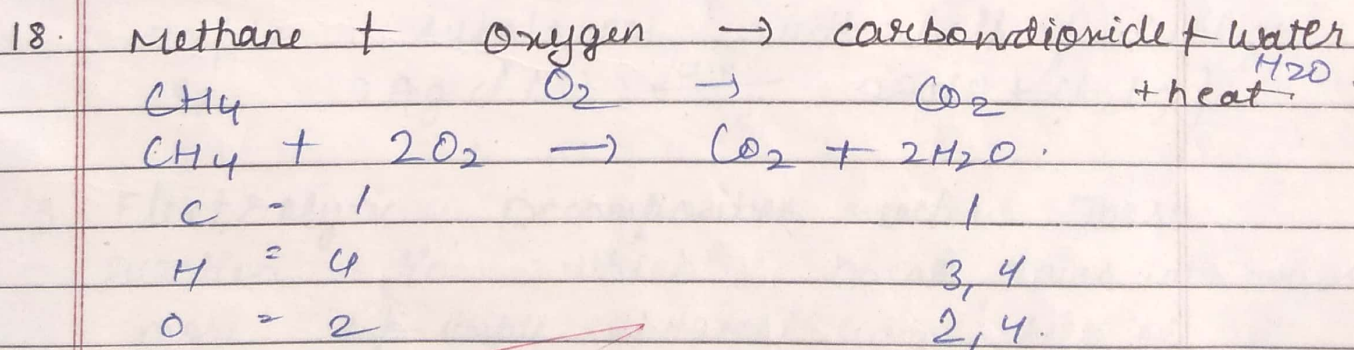
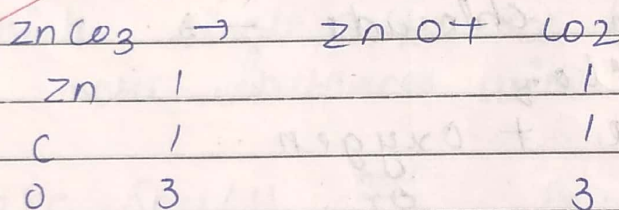
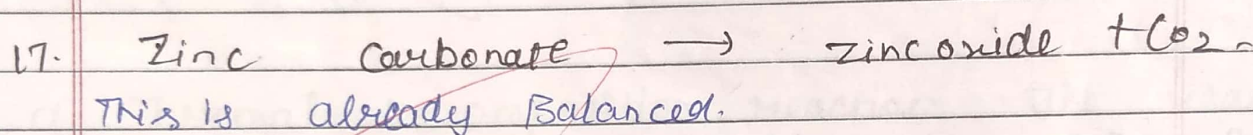
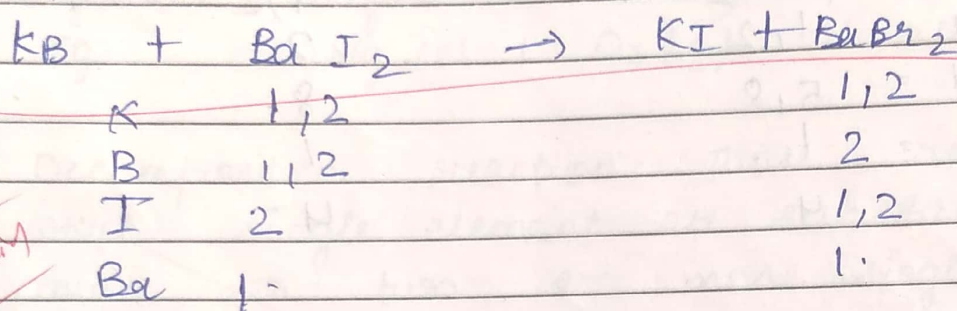
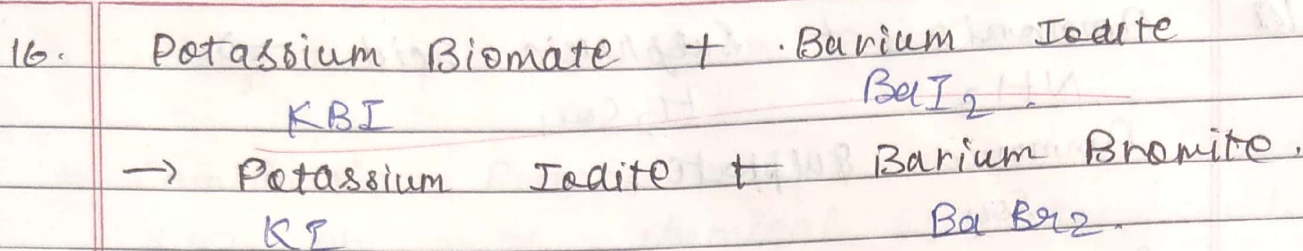


14. Zinc + Silver Nitrate $\rightarrow$ Zinc Nitrate +
 Zn AgNO_3 $\rightarrow$ $\text{Zn}(\text{NO}_3)_2$
 Silver
 Ag

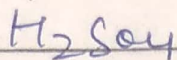
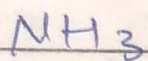


15. Aluminium + copper chloride $\rightarrow$
 Al CuCl_2
 Aluminium chloride + copper
 AlCl_3 Cu

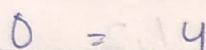
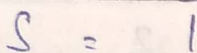
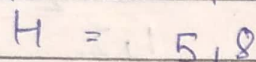
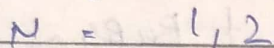
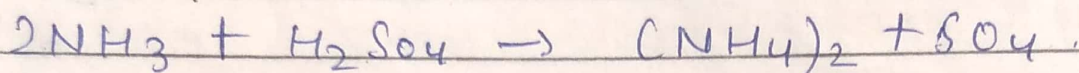




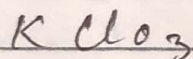
19. Ammonia + Sulphuric acid $\rightarrow$



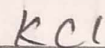
Ammonia Sulphate
Soy.



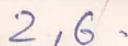
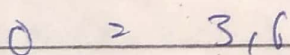
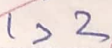
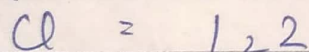
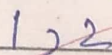
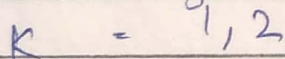
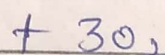
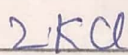
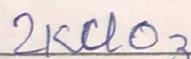
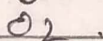
20. Potassium chloride $\rightarrow$



Potassium

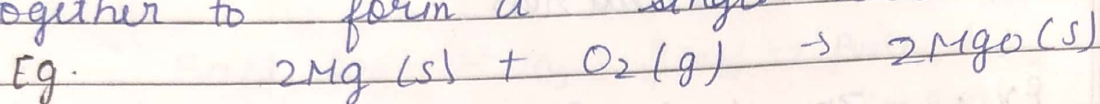


Chloride + Oxygen



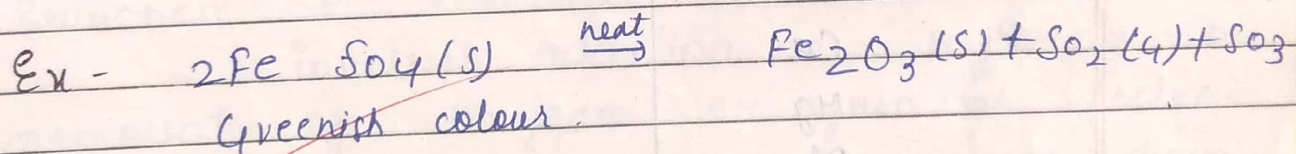
Types of chemical Reaction

Combination Reaction: The reaction in which two or more chemical substance combine together to form a single substance.

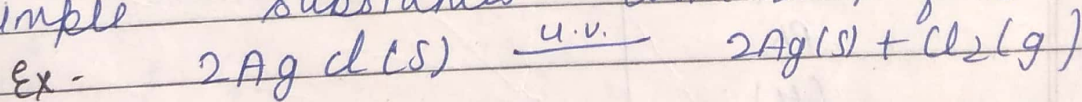


Decomposition reaction: Those reaction in which single element or substance breaks down into two or more single substances.

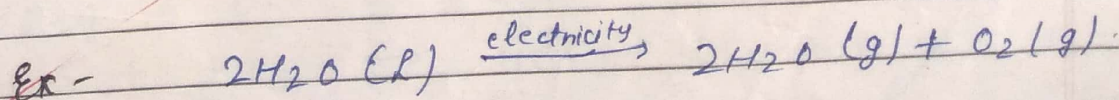
a. Thermal Decomposition reaction: The reaction in which single substance breaks down into 2 or more substances with help of heat.



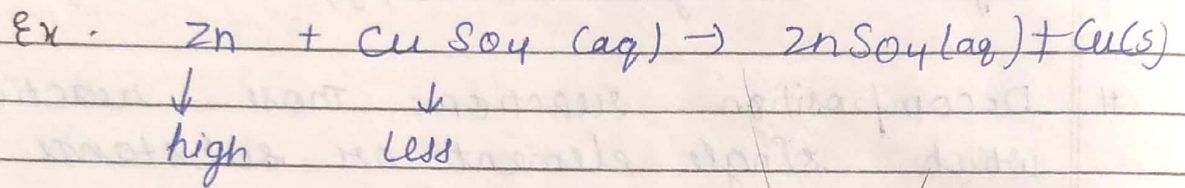
2. Photolytic Decomposition Reaction: Those reaction in which break down into two or more simple substances with help of Sunlight.



3. Electrolytic Decomposition reaction: Those reaction in which break down into two or more ~~simple~~ simple substances with help of electric city is called Electrolytic.



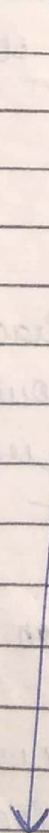
Displacement reaction: These reaction in which a more reactive element displaces a less reactive element from its compound is known as Displacement reaction.



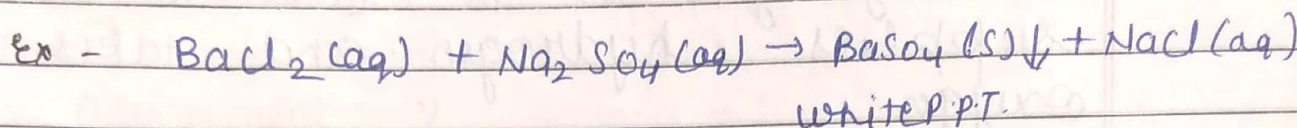
Reactivity series - The arrangement of metals in a vertical column in order of their decreasing reactivity from top to bottom is known as reactivity series.

Ex -

K
Na
Ca
Mg
Al
Zn
Fe
Sn
Pb
(H)
Cu
Ag
Au
Pt

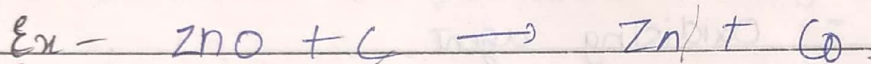


Double Displacement reaction: Those reaction in which 2 compounds react with each other by exchanging their ions to form new compounds are known as Double Displacement reaction.



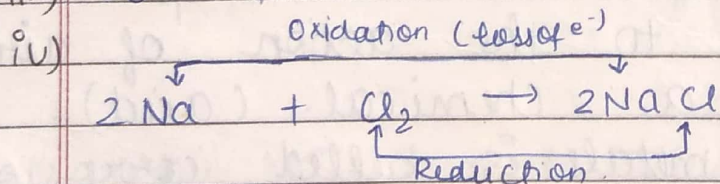
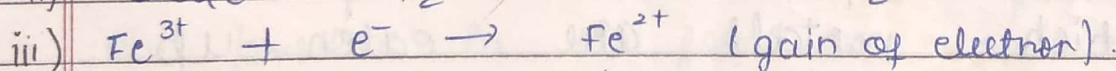
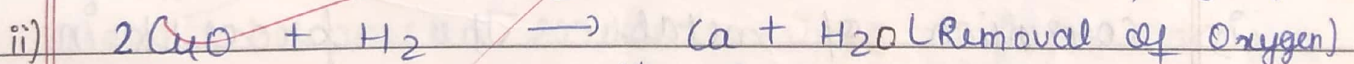
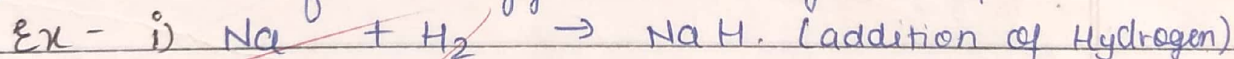
Redox reaction:

A chemical reaction in which oxidation and reduction take place simultaneously is known as Redox reaction.

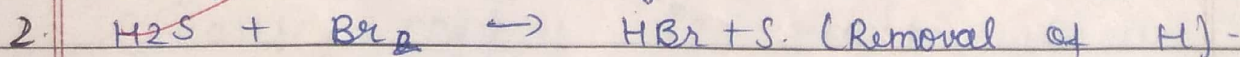
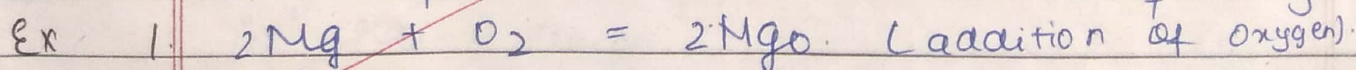


SO
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Reduction: A chemical reaction which involves addition of Hydrogen or removal of Oxygen or gain of electron.

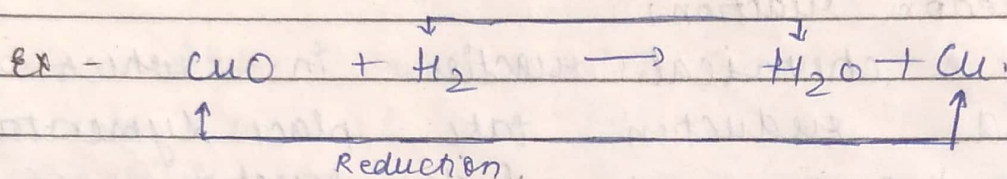


Oxidation - A chemical reaction which involves addition of oxygen and loss of electron and Removal of Hydrogen.



Oxidising agent $\Rightarrow$ It is a substance which supplies oxygen or takes up hydrogen.

Reducing agent - It is substance which supplies hydrogen and takes up oxygen.

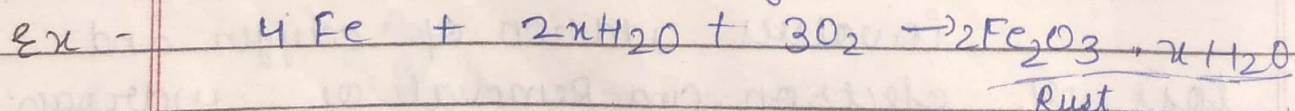


CuO = Oxidising agent
 H_2 = Reducing agent

Effect of oxidation in everyday life:

1. Corrosion
2. Rancidity -

(i) Corrosion of metals - The process in which metals are eaten up slowly due to the action of air moisture or a chemical (acid).
On surface of metals is called corrosion.
The most common example of Corrosion is rusting.



2. Rancidity = Oxidation of oils and fats in a food by atmospheric oxygen resulting into an unpleasant smell and taste is called Rancidity.

Assignment - 2

Ques 1. when Carbon dioxide gas passed through lime water it turns milky colour.

$$\text{CO}_2 + \text{Ca(OH)}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$$

Ques 2. what is Rust?
 Rust = Rusting of Iron.

$$4\text{Fe} + 2\text{H}_2\text{O} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O} (\text{Rust})$$

Ques 3. How does food becomes Rancid?

Food becomes rancid when fat and oil present in the food are oxidized.

Ques 4. why Gold and Silver don't corrode?
 - Gold and silver do not corrode because they are less reactive element after long time.

Ques 5. why does a copper vessel has Green coating in rainy season?

Ans. Because copper is react with moisture and Air and to form Green coating.

Ques 6. which gas burns with the pop smell?

Ans. Hydrogen gas

Ques 7. why is Hydrogen ^{peroxide} stored in coloured Bottles?

Ans. It is done to prevent photolytic decomposition of Hydrogen peroxide.

Ques 8. Give 2 ex. from everyday life where Redox reactions takes place?

Ans. Corrosion and Rancidity.

Ques 9. In electrolysis of water. why is v. volume of gas collected over + electrode double that gas collected over other electrode?

Ans.

Ques 10. In Silver, what material kept in solution of copper sulphate what change occur?

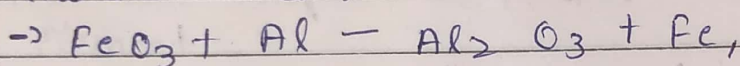
Ans. No reaction takes place because copper is highly reactive than silver.

Ques 11. why does milk become sour kept for long time?

Ans: milk contains bacteria and these bacteria use lactose as source of energy. And turn it into electric acid. make milk sour

Ques 12. what is thermite reaction?

Ans The thermite reaction is of metal oxide with Al powder then Al acts as reducing agent and reaction is highly exothermic. is called thermite reaction.



Ques 13. what is electrolysis?

It is the chemical reaction decomposition produced by passing an electric current through a sol. containing ions.

Ques 14. write chemical formulas of calcium chloride? Iron, Bromine, Sodium zincate, leadphosphate?

1. Calcium fluoride = CaF_2

2. Iron — FeBr_2

3. Na_2ZnO_2

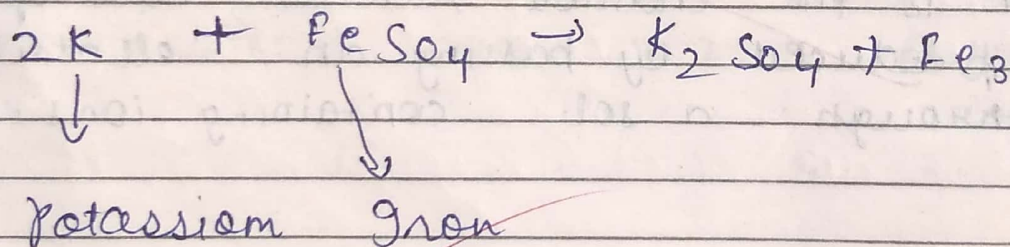
4. $\text{Pb}_3(\text{PO}_4)_2$

5. $\text{Cu} + \text{Ag}(\text{NO}_3)$

Ques 15 A copper coin in solution of AgNO_3 .
what will happen to coin and colour.
Copper is more reactive than silver
it will displace silver from its salt
solution and sol. will turn blue due to
formation of copper Nitrate
→ $\text{Cu} + \text{AgNO}_3 = \text{Cu}(\text{NO}_3)_2 + \text{Ag}$

Ques 16 Name the metal placed in iron sulphate sol. discharge green colour?
Write the eq. and explain reason?

Potassium is more reactive than iron
and it would displace it



Ques 17 A solution of substance ~~act~~ x used for white washing?

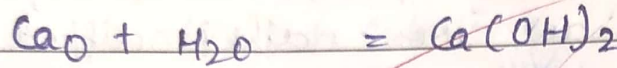
- Name the substance act and formula
- Write reaction of substance x with water.

Ans (i)

The sol. x used for white washing
is Quick lime CaO .

Ans

when quick lime mixed with water then reaction takes place.



quick lime

slaked lime

Ques 18

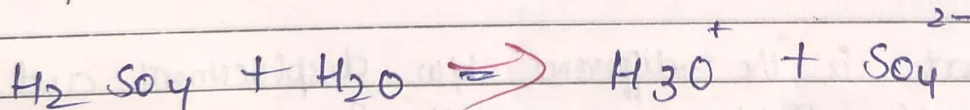
Hydrogen is highly inflammable gas and O_2 supporter of but water is made up of Hydrogen and oxygen. Used to extinguish fire. why?

It is due to the fact that compound should not have properties of its constituting element

Ques 19

write chemical eq. b/w Sulphuric acid & water.

Ans



~~takes~~
chemical eq.

Ques 20

Can Rusting of Iron take place in distilled water?

Ans

No Rusting in take place in distill is it neither contains dissolved impurities

= lemon, detergent, Baking soda, Lassi, cold drink

seen
24/5

Ncert Questions

Ques 1 why does the colour of copper sulphate solution change when an iron nail is dipped in it.

Ans When an iron nail is dipped in copper sulphate solution, then the blue colour of copper sulphate solution changes because iron displaces copper from copper sulphate sol. to form a light green sol. of iron sulphate.

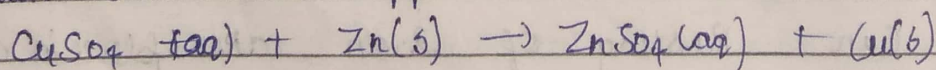
Ques 2 why is respiration considered an exothermic reaction? Explain.

Ans Reaction is considered an exothermic reaction because energy is released in this process. During respiration, glucose combines with oxygen of air in the cells of our body to form carbon dioxide and water, and energy is released.

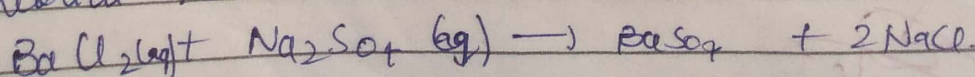
$$C_6H_{12}O_6(aq) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l) + \text{Energy}$$

Ques 3 what is the difference b/w displacement and double displacement reactions? Write eq. for these reactions.

Ans (i) A displacement reaction takes place b/w copper sulphate sol. and zinc to form zinc sulphate sol. and copper.



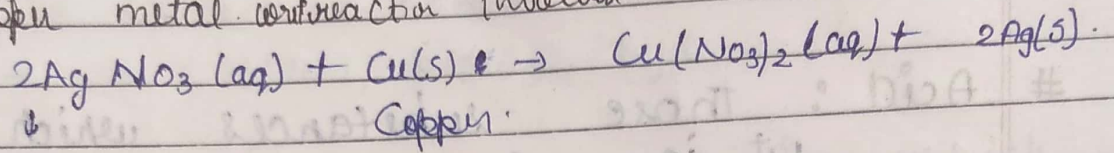
(ii) A double displacement reaction takes place b/w barium chloride sol. and sodium sulphate sol. to form a white precipitate of barium sulphate and sodium chloride sol.



Ques

In the reflecting of silver, the recovery of silver from silver nitrate sol. involved displacement by copper metal. write reaction involved.

Ans



Silver nitrate

Ques

Ans

Why do we apply paint on iron articles?
Paint is applied on iron particles to prevent their rusting when a coat of paint is applied to the surface of an iron article, then air and moisture cannot come in contact with the iron metal of article and hence no rusting takes place.

SBG STUDY