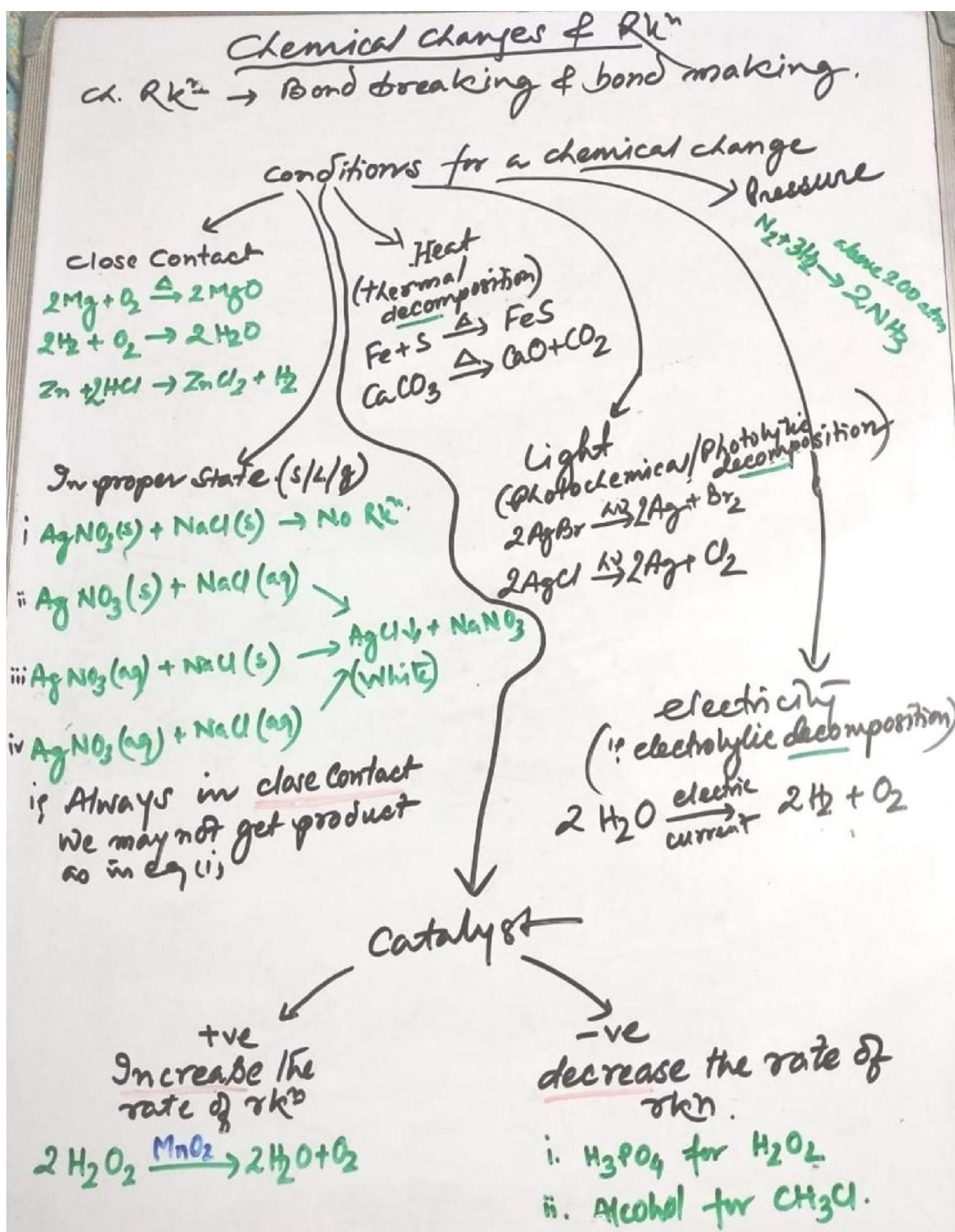


St. Xavier's School

Chemistry. Class 9

CHEMICAL CHANGE AND REACTIONS

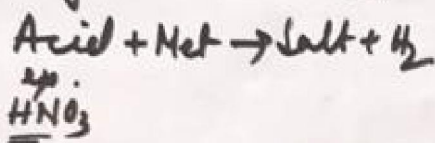
Date : 18/5/2020



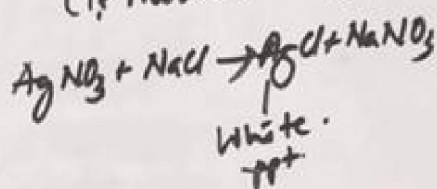
Characteristics of chemical Rxn

evolution of gas.

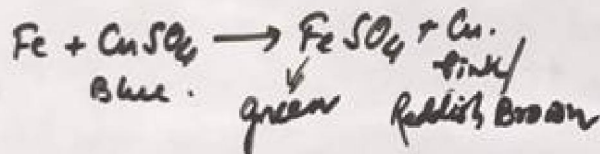
(Rxn in which gas comes out)



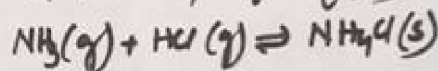
formation of precipitates.
(i.e. insoluble salt)



Change of colour.
(Reactants & Products colour are not same)

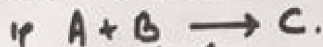


Change of state
(i.e. solid/liquid/gas)

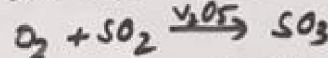
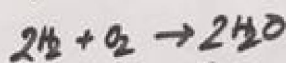


Types of ch. Change / ch. Rxn.

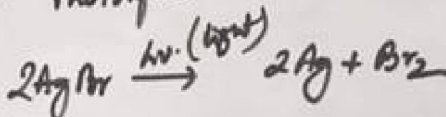
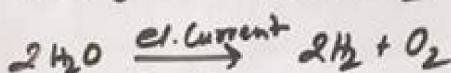
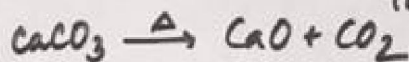
1) Direct Combination / Synthesis / Addition.



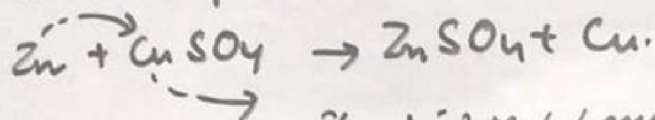
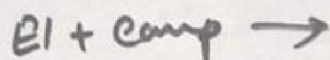
Element Element Compound
Element Compound Compound
Compound Compound Compound



2. Decomposition (by heat/light/sound/electric...)

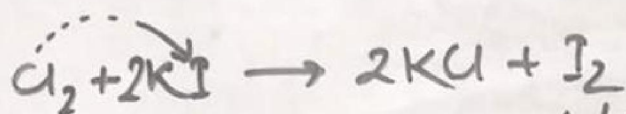


Displacement



Element: if Metal must be more reactive than the metal present in the compound.

∴ $Zn > Cu$ or Zn is above Cu in R. Series.



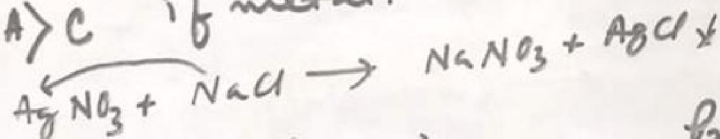
Element is non metal; then the non metal in elementary form must be more reactive than that of the compound.

$Cl > I$ or Cl is above I in P. Table.

Double decomposition:-



$A > C$ if metal.



Product may give salt & Water (Soluble)
In Acid + Base

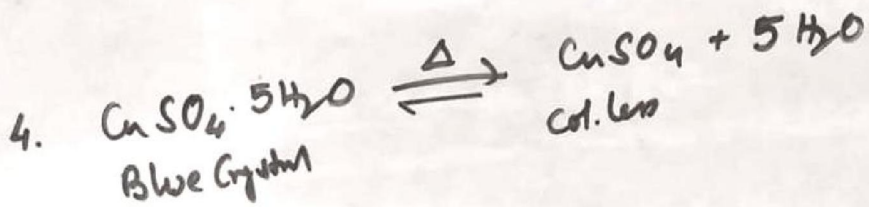
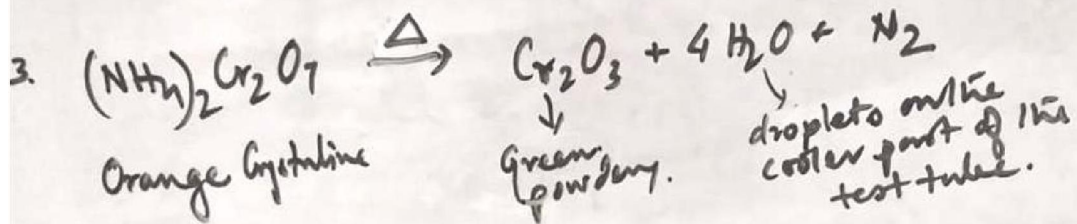
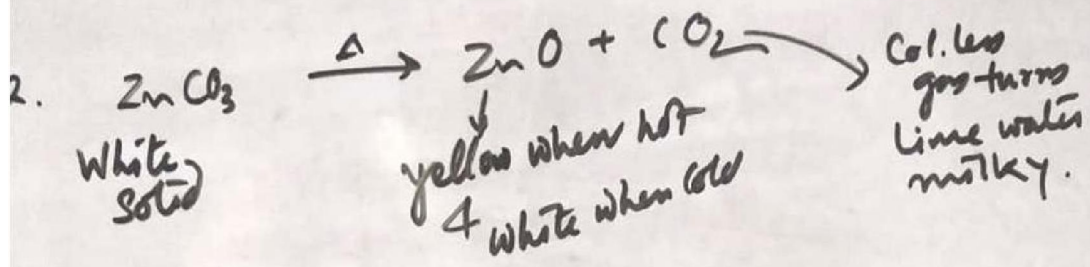
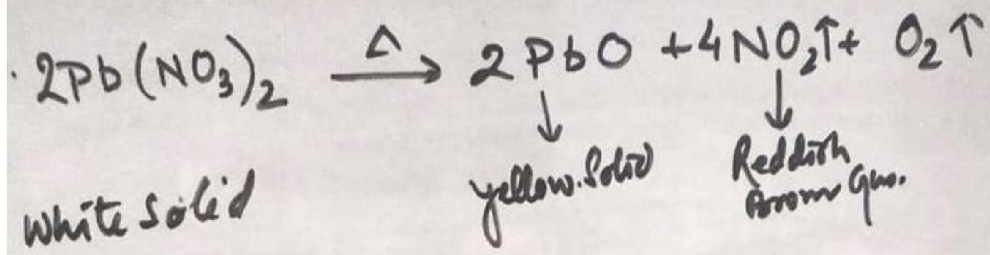
Neutralization
Product can be separated by evaporation / distillation

Product may be insoluble salt

precipitation.
shown by (\downarrow / s)

Product can be separated by filtration

OBSERVATION:-



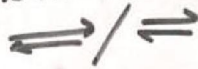
Reversible



Similarly

Reversed by changing Difference
the conditions under
which the rxn is taking
place;
is ΔH may not be
heat.

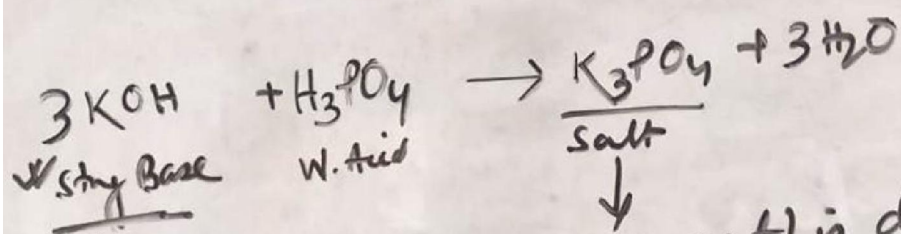
Dissociation



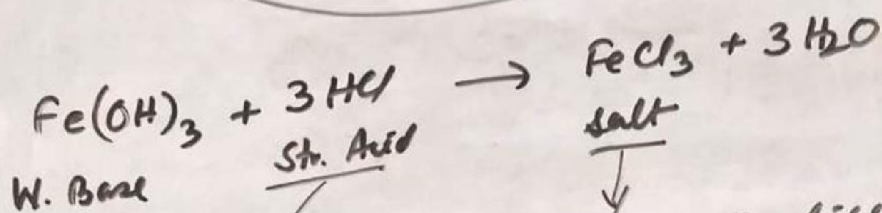
only due to heat
the rxn is reversible

Hydrolysis.

Salt + Water \rightarrow (Acidic/Basic) solⁿ. depends
on salt obtained from.
strong acid & weak Base
or weak acid & strong Base



\downarrow
if this salt is dissolved in
water; solution will be
Basic since parent base was
strong



\downarrow
If this salt is dissolved in
water; the solution will be acidic
as the parent acid is strong

COMPLETE THE EXERCISE IN YOUR COPY

(HOME WORK)

EXERCISE 2(A)

- What is a chemical reaction ?
 - State the conditions necessary for a chemical change or reaction.

- Define the following terms

- Chemical bond
- Effervescence
- Precipitate

- Give an example of a reaction where the following are involved

- Heat $\text{CuCO}_3 \xrightarrow{\Delta} \text{CuO} + \text{CO}_2$
- Light $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Electricity $2\text{H}_2\text{O} \xrightarrow{\text{Electricity}} 2\text{H}_2 + \text{O}_2$
- Close contact $\text{PbNO}_3 + 2\text{KI} \rightarrow 2\text{KNO}_3 + \text{PbI}_2$
- Solution $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
- Pressure $\text{N}_2 + 3\text{H}_2 \xrightarrow{\text{Pressure}} 2\text{NH}_3$
- Catalyst $2\text{KClO}_3 \xrightarrow{\text{MnO}_2} 2\text{KCl} + 3\text{O}_2$

- Define :

- Photochemical reaction - $\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Electrochemical reaction. $2\text{H}_2\text{O} \xrightarrow{\text{Electricity}} 2\text{H}_2 + \text{O}_2$

Give one example in each case.

- Give an example of each of the following chemical changes.

- A photochemical reaction involving

(i) silver salt (ii) water $\text{AgNO}_3 \xrightarrow{\text{Light}} 2\text{Ag} + 2\text{NO}_2 + \text{O}_2$

- A reaction involving

(i) blue solution $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$

(ii) formation of dirty green precipitate

- Two gases combine to form white solid.

- A reaction where colour change is noticed.

- Write the chemical reaction where the following changes are observed.

- Gas is evolved $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
- Colour change is noticed $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
- Precipitate is formed $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
- Physical state is changed $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl(s)}$

- Give reason for the following :

- Silver nitrate solution is kept in coloured bottles. *decomposes in presence of light*
- Molybdenum is used in the manufacture of ammonia. *increases the efficiency of catalyst Fe*
- Blue solution of copper sulphate changes to green when a piece of iron is added to this solution. *due to formation of ferrous sulphate*

EXERCISE 2(B)

1. Complete the following statements.

- (a) The chemical change involving iron and hydrochloric acid illustrates a displacement reaction.
- (b) In the type of reaction called double displacement, two compounds exchange their positive and negative radicals.
- (c) A catalyst either accelerate or decelerate the rate of a chemical change but itself remains unaffected at the end of the reaction.

2. When hydrogen burns in oxygen, water is formed; when electricity is passed through water, hydrogen and oxygen are given out. Name the type of chemical change involved in the two cases. Combination/Decomposition

3. Explain, giving one example for each of the following chemical changes:

- (a) Double decomposition $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
 $\text{CuSO}_4 + \text{Zn} \rightarrow \text{Cu} + \text{ZnSO}_4$
 (b) Thermal dissociation $2\text{HgO} \xrightarrow{\Delta} 2\text{Hg} + \text{O}_2$
 (c) Reversible reaction $\text{CuSO}_4 + 2\text{H}_2\text{O} \rightleftharpoons \text{CuSO}_4 \cdot 2\text{H}_2\text{O}$
 (d) Displacement $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$

4. What is synthesis? What kind of chemical reaction is synthesis? Support your answer by an example.

5. Decomposition brought about by heat is known as thermal decomposition. What is the difference between thermal dissociation and thermal decomposition.

2. brought about by heat
 $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$

1. Simultaneous reversible decomposition rxn brought only by heat
 $\text{NH}_4\text{Cl} \rightleftharpoons \text{NH}_3 + \text{HCl}$

6. Define neutralization reaction. Give three applications of neutralization reactions.

7. What do you understand by hydrolysis? Explain giving examples.

8. Iron (III) chloride is acidic while sodium carbonate is basic. Explain.

9. What is decomposition? Support your answer by an example.

10. State the type of reactions each of the following represent and balance the ones that are not balanced.

- (a) $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$ Displacement
 (b) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$ Displacement
 (c) $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$ Decomposition
 (d) $\text{PbO}_2 + \text{SO}_2 \rightarrow \text{PbSO}_4$ Combination
 (e) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$ Double decomposition (ppt)
 (f) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ Decomposition
 (g) $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$ Decomposition
 (h) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{HNO}_3 + \text{KHSO}_4$ Double decomposition
 (i) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$ Displacement
 (j) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ Decomposition
 (k) $\text{NH}_4\text{Cl} \rightarrow \text{NH}_3 + \text{HCl}$ Decomposition

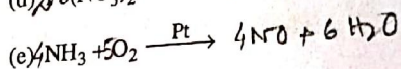
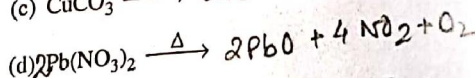
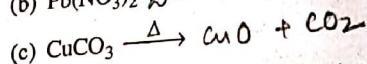
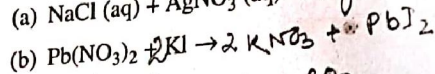
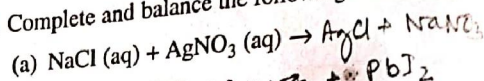
EXERCISE 2(C)

- State the main characteristics of chemical reactions. Give at least one example in each case.
- Define exothermic and endothermic changes. Give two examples in each case.
- State the effects of endothermic and exothermic reactions on the surroundings.
- Give an example of a reaction where the following are involved
 $C + O_2 \rightarrow CO_2 + \Delta$
 (a) Evolution of heat
 $C + 2S \xrightarrow{\Delta} CS_2$
 (b) Absorption of heat
 $N_2 + 3H_2 \xrightarrow[ab. 200 atm]{450^\circ C} 2NH_3$
 (c) High pressure is required
 $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
 5. Define :
 (a) Photochemical reaction
 (b) Electrochemical reaction. $2H_2O \xrightarrow{el} 2H_2 + O_2$
 Give one example in each case.
- Give an example of each of the following chemical changes.
 (a) A reaction involving
 (i) change of state $NH_3 + HCl \rightleftharpoons NH_4Cl$
 (ii) formation of precipitate $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$
 $C + O_2 \xrightarrow{\Delta} CO_2 + \Delta$ An exothermic and an endothermic reaction involving carbon as one of the reactants. $C + 2S \xrightarrow{\Delta} CS_2$
 (c) A reaction where colour change is noticed.
 $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

Blue
Green

7. What do you understand by 'chemical reaction.' ?

8. Complete and balance the following reactions :



9. What do you observe. When

- Lead nitrate is heated.
- Chlorine water is exposed to sunlight.
- Hydrogen peroxide is exposed sunlight.
- H_2S gas is passed through copper sulphate solution.
- Barium chloride is added to sodium sulphate solution.

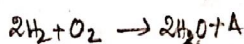
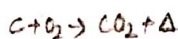
10. Name :

- a carbonate which do not decompose on heating. *Sodium carbonate*
- a nitrate which produces oxygen as the only gas. *Sodium nitrate*
- a compound which produces carbon dioxide on heating. *Zinc carbonate*
- a nitrate which produces brown gas on heating. *Lead Nitrate*

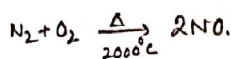
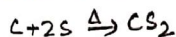
Q2

Exo.

Heat is given out



ENDO
Chemical Reaction
in which heat is
absorbed.

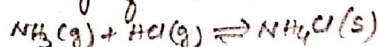


Q1. i) Evolution of gas. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2 \uparrow$

ii) change of colour $Fe + CuSO_4 \rightarrow Cu + FeSO_4$
blue
green

iii) Formation of ppt $AgNO_3 + NaCl \rightarrow AgCl \downarrow + NaNO_3$
white

iv) Change of state.



Q9 \rightarrow from colourless solid to yellow residue (lead monoxide) brown gas NO_2 obtained

6. Oxygen gas is evolved which is colourless, odourless.

7. gives colourless, odourless gas oxygen and H_2O .

8. Black ppt. of Copper Sulphide is obtained.

9. white ppt. of barium Sulphate

