

# Question Bank

Std- IX

Subject - Chemistry

## Chapter-1

### Language of Chemistry.

**QA. Choose the correct option.**

- The qualitative meaning of symbol O is  
a) One molecule    b) Polyatomic    c) Oxygen atom    d) 16 amu
- Valency of Aluminium is\_.  
a) 1    b) 2    c) 3    d) 4
- Which radical has valency 2- ?  
a) Nitrate    b) Carbonate    c) Ammonium    d) Chloride
- The standard for atomic mass is  
a) H-1    b) C-12    c) O-16    d) Na- 11
- Which one of the following shows variable valency?  
a) Sodium    b) Calcium    c) Potassium    d) Iron
- $X \text{KNO}_3 \rightarrow Y \text{KNO}_2 + Z \text{O}_2$  • To balance the equation X, Y and Z are respectively  
a) 2,0, 1    b) 2,2, 1    c) 1, 1,2    d) 1, 2,3
- If the formula of sodium chlorite is  $\text{NaClO}_2$ , then the Formula of Sodium perchlorate is  
a)  $\text{NaClO}$     b)  $\text{NaClO}_3$     c)  $\text{NaClO}_4$     d)  $\text{NaClO}_5$
- The chemical name of baking soda is  
a) Sodium carbonate    b) sodium hydroxide    c) Sodium bicarbonate    d) Caustic soda
- The number of C atoms in Hydrogen carbonate radical is  
a) 1    b) 2    c) 3    d) 4
- Relative molecular mass of Sulphuric acid is\_. [H-1, S-32, O-16]  
a) 64 amu    b) 98 amu.    c) 32 amu    d) 100 amu

**QB • Differentiate the following on the basis of the given criteria.**

- 1 • Mercurous and mercuric (valency)
- 2 • Radical and Molecule (Charge)
3. Cations and anion (Gain or loss of electrons)
4. Valency and Variable valency (definition)
- 5 • Atom and Molecule (Existence)

**QC-Assertion and Reason**

**In the questions given below, there are two statements marked as Assertion (A) and Reason (R) .Read the statements and choose the correct option.**

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

A is false and R is true

1. A-The positive part is written first while naming a compound.

R-Metals have positive valency.

2. A-Molecular Formula of phosphorus is  $P_4$ .

R-Phosphorus is a polyatomic molecule.

3. A-The formula of calcium phosphate is  $Ca_3(PO_4)_2$ .

R-Valency of Ca is 3 and phosphate is 2.

4. A- Gram atomic mass of Oxygen is 16g.

R-It is the relative atomic mass expressed in grams.

- 5- A- Hydrochloric acid is a tertiary acid.

R -It has 2 elements Hydrogen and Chlorine.

**Q D. Answer the following questions.(Give Reason)**

1 • Explain with reason why Sulphur is written as  $S_8$  but not S in its molecular formula, while Sodium is written simply as Na.

2. The molecule of a compound is always electrically neutral, why?

3. A compound has formula  $Fe_2O_3$ . Analyse the valency of iron in the compound and write the formula of the compound if iron shows its lower valency with oxygen.

4 • Radicals are more reactive in aqueous or molten state. Give the reason.

5. In a water molecule the % by mass of hydrogen is 11.11%. How?

**QE • Answer the following questions. based on the given case.**

### Case-1

A student is asked to prepare a list of compounds for the laboratory. He wrote  $MgCl$ ,  $AlSO_4$ ,  $CaPO_4$  on the Blackboard. Then the teacher asked all the children to

- i) Identify the mistakes.
- ii) Write the electropositive and electronegative radicals of the compounds.
- iii) Which radical from the above is a trivalent polyatomic anion?
- iv) Make compounds with radicals having valency
  - a) 2+ and 2-
  - b) 2+ and 1-
  - c) 3+ and 3-

### Case-2

A teacher gave cards of different positive and negative ions to the students, like Fe (II), Fe (III), Cu (II) and Al (III), Sulphate, Carbonate and Chloride ions • Then they are asked to

- i) Create 4 different compounds (one with each ion).
- ii) Identify the cations and anions of the compounds
- .iii) What is the difference between Fe (II) and Fe(III)? Criteria- a)valency b) Name
- iv) What are the colours of hydroxides of the cations given above?
- v) Select one radical from valency 2+ and one from 2- • Write the compound and its colour.

**QF • According to the diagram given, answer the following questions.**

## Valency Chart

Ammonium	$\text{NH}_4^+$	Magnesium	$\text{Mg}^{2+}$	Hydroxide	$\text{OH}^-$	Nitride	$\text{N}^{3-}$
Sodium	$\text{Na}^+$	Calcium	$\text{Ca}^{2+}$	Nitrate	$\text{NO}_3^-$	Phosphate	$\text{PO}_4^{3-}$
Cuprous	$\text{Cu}^+$	Cupric	$\text{Cu}^{2+}$	Carbonate	$\text{CO}_3^{2-}$	Chloride	$\text{Cl}^-$
Plumbous	$\text{Pb}^{2+}$	Plumbic	$\text{Pb}^{4+}$	Sulphate	$\text{SO}_4^{2-}$	Manganate	$\text{MnO}_4^-$

- i) A compound has the formula  $\text{X}_3\text{Y}_2$
- Identify possible X and Y from the valency chart.
  - Write the name of one such compound.
  - Which one from the above is a metal, X or Y?
- ii) Which one of the following is a polyatomic ion?  $\text{NH}_4$  or  $\text{OH}^-$ . Justify your answer.
- iii) Write any one example of a Divalent monoatomic cation .
- iv) Identify the acidic radical in Magnesium chloride.
- v) In the table lead is written in two forms with different numbers. Explain why it is so?

## Chapter-2

## Chemical reaction.

**Q- A. Choose the correct answers from the given options.**

1. A substance that alters the rate of reaction without being consumed is
  - a) Promoter
  - b) Catalyst
  - c) Inhibitor
  - d) Reactant
  
2. The colour of lead monoxide is yellow when cold, what is the colour when hot?
  - a) Green
  - b) yellow
  - c) Black
  - d) White
  
3. When a compound decomposes into two elements, the reaction is called
  - a) Decomposition
  - b) Thermal dissociation
  - c) Analysis
  - d) Synthesis.
  
4. A hydrated compound which changes from blue to white on heating is
  - a) White Vitriol
  - b) Sodium Bicarbonate
  - c) Epsom salt
  - d) Hydrated copper sulphate
  
- 5- A metal nitrate that decomposes to give oxygen only
  - a)  $\text{NaNO}_3$
  - b)  $\text{Pb}(\text{NO}_3)_2$
  - c)  $\text{Ca}(\text{NO}_3)_2$
  - d)  $\text{Cu}(\text{NO}_3)_2$
  
6. A metal which reacts reversibly with steam is
  - a) Cu
  - b) Fe
  - c) Pb
  - d) Zn
  
7. Formation of Ammonia from its element is
  - a) direct combination
  - b) Neutralisation
  - c) Synthesis
  - d) Precipitation
  
- 8- When a metallic oxide reacts with water, it forms
  - a) Acids
  - b) Alkalies
  - c) Bases
  - d) Salts.
  
- 9- Upon heating solid lead nitrate in a test tube, we observe
  - a) fumes of yellow colour

- b) melting of the solid
- c) formation of black residue
- d) Reddish brown colour fumes

10. Copper, silver and gold don't react with dilute acids to liberate hydrogen, because

- a) They are metals
- b) They are monoatomic
- c) They liberate only oxygen
- d) They are less reactive than hydrogen.

### Q. B.Assertion-Reason

**In the questions given below, there are two statements marked as Assertion (A) and Reason (R) .Read the statements and choose the correct option.**

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

1 • A- Displacement reactions occur according to the reactivity series.

R- A more reactive metal can displace a less reactive metal from its salt solution.

2 • A-Hydrogen acts as a reducing agent when passed over heated copper oxide.

R-Hydrogen gains oxygen in the reaction.

3 .A-Rust is formed on Iron when exposed to moist air.

R-Rusting is a physical change.

4. A- When chlorine gas is passed through the solution of KI, it turns brown in colour.

R- Iodine is formed during the reaction .

5- A- Nitrogen and oxygen are heated at a temperature of 3000°C to produce NO.

R-This is an exothermic reaction.

**Q.C • Give a reason.**

1 • Oxidation and reduction always occur simultaneously • Support your answer by taking the example of reaction between Copper oxide and Hydrogen.

2. Respiration is considered as an exothermic reaction while photosynthesis is an endothermic reaction, why?

3 • Zinc reacts with dilute Hydrochloric acid, but copper does not react with the same acid.

4. A student observed that after heating a certain amount of Copper Carbonate in a test tube, the weight of the residue decreases. Give reason.

5. Copper objects turn black over time. Why?

**Q.D. Write the differences between the followings based on the criterias given.**

i) Analysis and Synthesis (Definition)

ii) Exothermic and endothermic (Heat change)

iii) Oxidation and Reduction (Oxygen)

iv) Promoter and Inhibitor (Effect)

v) Thermal decomposition and thermal dissociation (Definition)

**Q. E. Answer the following questions based on the cases given.**

**Case I**

A teacher told a student to add some zinc granules in a test tube containing dilute Hydrochloric acid.

i) Write the chemical equation for the reaction.

ii) Name the gas that evolved in the reaction.

iii) The teacher brought a glowing matchstick near the mouth of the test tube, what the children observe?

iv) Identify the type of reaction.

**Case-II**

Marble  $\rightarrow$  Calcium oxide + gas A

$\downarrow$  + little water

Solid B

$\downarrow$  + excess water

Solution C

- i) Identify A, B and C.
- ii) What do you observe when drops of water are added to calcium oxide.
- iii) What happens when carbon dioxide is bubbled first in little and then in excess amount?
- iv) Write the relevant equations for the above reactions occurred in (iii)
- v) Write your observation on boiling the solution

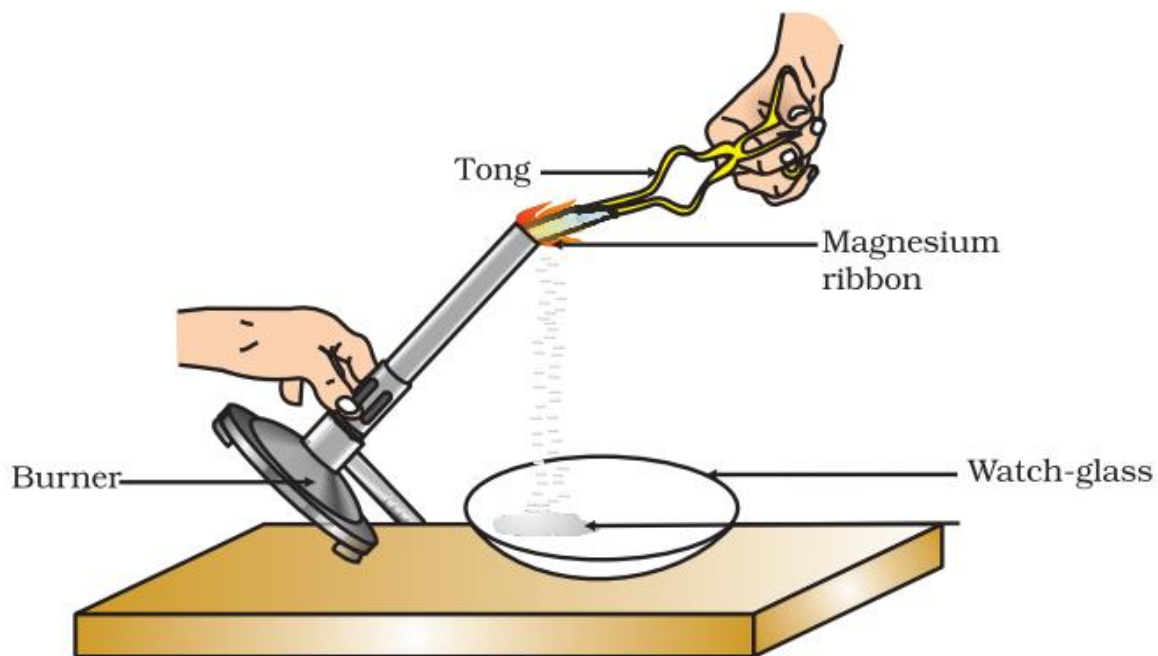
### **Case-III**

A metallic nitrate A on heating gives a metallic oxide B along with evolution of reddish brown gas C and a Colourless gas D which helps in burning. An aqueous solution of A when reacts with potassium iodide solution, forms a yellow precipitate E.

- i) Identify A, B, C, D and E.
- ii) Write the equation for the thermal decomposition of A.
- iii) Write the equation to show the formation of E.
- iv) What do you observe during the thermal decomposition of A.

**Q.F. Answer the following questions according to the pictures given.**

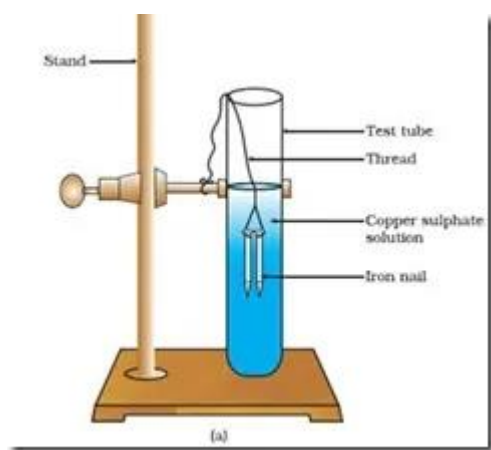
### **Picture- I**



Burning of Magnesium ribbon.

- i) Identify the type of reaction shown in the picture.
- ii) Write the balanced chemical equation for the reaction.
- iii) Is this an exothermic or endothermic reaction?
- iv) What do you observe during the reaction?
- v) Why is magnesium ribbon cleaned before burning?

### Picture-II



Iron nail in  $\text{CuSO}_4$  solution

- i) Name the type of reaction.
- ii) What is the observation from the reaction?
- iii) Write the balanced chemical equation for the reaction.
- iv) What is deposited on the iron nail, and why?
- v) What would be the observation if copper is kept in Iron (II) sulphate solution?



**Picture III**

- i) Write the balanced chemical equation for the reaction.
- ii) Name the type of reaction.
- iii) Which gas is produced in the reaction?
- iv) How can this gas be identified ?
- v) Write the chemical name of vinegar and baking soda.

**Q.G. Complete the following table which refers to the action of heat on the given substance.**

Substances	Colour before heating	Colour of the residue	Name of the gas	Name of the residue left
$\text{CuCO}_3$				
$\text{Pb}(\text{NO}_3)_2$				
$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$				
$\text{ZnCO}_3$				

**Q.H. An element M has 3 electrons more than the noble gas. Write the Formula of its**

- i) Chloride
- ii) Sulphate
- iii) Hydroxide
- iv) Phosphate
- v) Oxide

**Answers of Chapter 1 LANGUAGE OF CHEMISTRY**

QA.1.c) Oxygen atom

2.c) 3

3.b) Carbonate

4.b) C-12

5.d) Iron

6.b) 2,2,0

7.c)  $\text{NaClO}_4$

8.c) Sodium bicarbonate

9.a) 1

10.b) 98 amu

QB.

Q1	Mercurous	Mercuric
Valency	1	2
Q2	Radical	Molecule

Charge	Net positive or negative charge	Neutral
Q3	Cations	Anions
Electrons	Loss of electrons	Gain of electrons
Q4	Valency	Variable valency
Definition	Number of electrons accepted or donated by an atom to get nearest noble gas configuration	Atoms when shows more than one valency
Q5	Atoms	Molecules
Existence	May or may not exist independently	Always exists independently

#### QC. ASSERTION REASON

1. Option a      2. Option a      3.Option c      4.Option a      5.Option d

#### QD. Give Reason

1. Sulphur exists as a poly atomic molecule containing 8 Sulphur atoms joined together, so its molecular formula is written as  $S_8$ . But Sodium exists as a single atom, Therefore its symbol is written simply as Na.

2. A compound is formed when atoms or radicals combine together. During combination metals form positive ions and nonmetals form negative ions. So the total positive charge and total negative charge in the molecule are equal, hence the molecules are electrically neutral.

3. In the formula  $Fe_2O_3$ , The valency of oxygen is 2 and the valency of iron is 3. Iron shows variable valencies of 2 and 3. Iron with lower valency when combined with oxygen forms the compound FeO.

4. A radical is an atom or group of atoms carrying a positive or negative charge. In solid compounds, the ions are tightly packed and can not move freely. Therefore they do not react easily. But when a compound dissolves in water the radicals( ions) become free to move. These free ions can easily come in contact with other ions and react easily.

5. The formula of water is  $H_2O$ . Its molecular mass is 18 amu. ( $2 \times 1 + 16 = 18$ ). So the % of hydrogen in water molecules is  $\frac{2}{18} \times 100 = 11.11\%$ .

#### Q E. CASE-1

1. The compounds written by the students are not correct because the valency of the radicals are not balanced properly.

Correct formulas are—  $\text{MgCl}_2$  ,  $\text{Al}_2(\text{SO}_4)_3$  ,  $\text{Ca}_3(\text{PO}_4)_2$

2. All the positive radicals are basic radicals (Cation) and all the negative radicals are acidic radicals (Anion) in the compounds.

3. Tri valent polyatomic anion- Phosphate ion(  $\text{PO}_4^{3-}$ )

4.

Positive valency	Negative valency	Cation	Anion	Compound
2 <sup>+</sup>	2 <sup>-</sup>	$\text{Mg}^{2+}$	$\text{SO}_4^{2-}$	$\text{MgSO}_4$
2 <sup>+</sup>	1 <sup>-</sup>	$\text{Ca}^{2+}$	$\text{Cl}^-$	$\text{CaCl}_2$
3 <sup>+</sup>	3 <sup>-</sup>	$\text{Al}^{3+}$	$\text{PO}_4^{3-}$	$\text{AlPO}_4$

#### CASE-II

1.

Electro positive ion	Electro negative ion	Compound
$\text{Fe}^{2+}$	$\text{Cl}^-$	$\text{FeCl}_2$
$\text{Fe}^{3+}$	$\text{SO}_4^{2-}$	$\text{Fe}_2(\text{SO}_4)_3$
$\text{Cu}^{2+}$	$\text{CO}_3^{2-}$	$\text{CuCO}_3$
$\text{Al}^{3+}$	$\text{Cl}^-$	$\text{AlCl}_3$

2. All the positive ions are cations and negative ions are anions of the compounds.

3.

Criteria	Fe(II)	Fe(III)
Valency	2	3
Name	Ferrous ion	Ferric ion

4.

Cation	Hydroxides	Colour
$\text{Fe}^{2+}$	$\text{Fe}(\text{OH})_2$	Dirty green

$\text{Fe}^{3+}$	$\text{Fe}(\text{OH})_3$	Reddish brown
$\text{Cu}^{2+}$	$\text{Cu}(\text{OH})_2$	Blue
$\text{Al}^{3+}$	$\text{Al}(\text{OH})_3$	Gelatinous white

5.

One radical with valency 2+ = Copper

Valency 2- = Carbonate

Compound = Copper carbonate ( $\text{CuCO}_3$ )

Colour = Green

QF. i) a) Possible X—  $\text{Mg}^{2+}$   $\text{Ca}^{2+}$   $\text{Cu}^{2+}$   $\text{Pb}^{2+}$

Possible Y—  $\text{N}^{3-}$   $\text{PO}_4^{3-}$

b) Calcium Phosphate —  $\text{Ca}_3(\text{PO}_4)_2$

c) X is the metal because X represents positive ions or Cations like Magnesium or Calcium.

ii) Both are polyatomic ions because each contains more than one atom.

iii) Magnesium ion is a divalent monoatomic ion .

iv) In Magnesium chloride the acidic radical is the negative ion ie  $\text{Cl}^-$  or Chloride ion.

v) Lead is written as Plumbous and Plumbic because Lead shows variable valency of 2 and 4.

Plumbous with lower valency 2 and Plumbic with higher valency 4.

## CHAPTER-2 CHEMICAL REACTION

QA.1.b) Catalyst

2. b) Yellow

6.b) Fe

3. c) Analysis

7. c) Synthesis

4.d) Hydrated  $\text{CuSO}_4$

8.b) Alkalies

5.a)  $\text{NaNO}_3$

9.d) Reddish brown

10.d) They are less reactive than Hydrogen

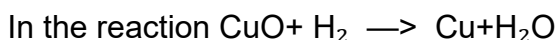
QB.1.Option a

2.Option a

3.Option c

- 4. Option a
- 5. Option c

QC. 1. Oxidation and reduction occur simultaneously because when one substance gains oxygen or loses hydrogen, another substance loses oxygen or gains hydrogen at the same time.



Copper oxide loses oxygen to form copper, so it is reduced. Hydrogen gains oxygen to form water, so it is oxidised. Hence oxidation and reduction occur together.

2. Respiration is an exothermic reaction because energy is released during the breakdown of glucose. Photosynthesis is an endothermic reaction because plants absorb sunlight to prepare food.

3. Zinc reacts with dil Hydrochloric acid because it is more reactive or above Hydrogen in metal activity series .So it can displace hydrogen from the acid.Copper is below Hydrogen in metal activity series or less reactive than Hydrogen, so it can not displace Hydrogen from dil Hydrochloric acid.

4.While heating copper carbonate, it decomposes into copper oxide and carbon dioxide gas. The carbon dioxide gas escapes out of the test tube, so the weight of the residue decreases.

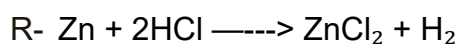
5. Copper objects turn black over time because copper reacts slowly with oxygen in the air to form copper oxide on the surface which is black in colour.

QD.

1.	Synthesis	Analysis
Definition	Reaction in which one compound breaks into two elements	Reaction in which two elements combine together to form a single compound
2,	Exothermic	Endothermic

Heat change	Heat is released during the reaction	Heat is absorbed during the reaction
3.	Oxidation	Reduction
Oxygen	Addition of oxygen to a substance	Removal of oxygen from a substance
4.	Promoter	Inhibitor
Effect	Increases the activity of a positive catalyst and speeds up the reaction	Slows down or decreases the rate of reaction
5.	Thermal decomposition	Thermal dissociation
Definition	Breakdown of a compound into simpler substances by heat and the change is irreversible.	Splitting of a compound into simpler substances by heat and the change is reversible.

#### QE. Case-I



S- The gas evolved is Hydrogen gas.

T- On bringing a glowing matchstick near the mouth of the test tube , the gas burns with a pop sound.

U- It is a displacement reaction.

#### Case-II

- i) A- Carbon dioxide.  
 B- Calcium hydroxide.  
 C- Lime water

ii) When water is added to CaO.....

Calcium oxide reacts vigorously with water

A hissing sound is produced

A large amount of heat is evolved(Exothermic reaction)

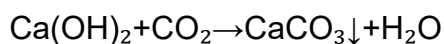
The solid swells and crumbles into white powder

iii) **(a) First in little amount:**Lime water turns milky due to formation of insoluble calcium carbonate.

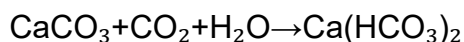
**(b) In excess amount:** The milkiness disappears because soluble calcium bicarbonate is formed.

iv) Relevant chemical equations:

Passing a little carbon dioxide through lime water:



Passing excess carbon dioxide:



v) On boiling the solution, milkiness reappears due to formation of  $\text{CaCO}_3$ .

### CASE-III

i) Identification of substances:

- d) **A** = Lead nitrate
- e) **B** = Lead oxide
- f) **C** = Nitrogen dioxide
- g) **D** = Oxygen
- h) **E** = Lead iodide

ii) Thermal decomposition of A:  $2\text{Pb(NO}_3)_2 + \text{HEAT} \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$

iii) Equation for the formation of E:  $\text{Pb(NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 \downarrow + 2\text{KNO}_3$

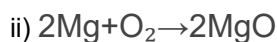
iv) Observations during the thermal decomposition of A:

- b) Reddish brown fumes of nitrogen dioxide gas have evolved.
- c) A yellow residue of lead oxide is left behind.
- d) A colourless and odourless gas is produced, which rekindles a glowing splint.

### QF. PICTURE -1

The picture shows the burning of magnesium ribbon.

i) It is a combination reaction because magnesium combines with oxygen to form magnesium oxide. It is also an oxidation reaction.



iii) It is an exothermic reaction because heat and light are produced during the reaction.

iv) Magnesium ribbon burns with a dazzling white flame.

A white powdery ash of magnesium oxide is formed.

v) Magnesium ribbon is cleaned with sandpaper to remove the thin layer of magnesium oxide formed on its surface. This oxide layer prevents magnesium from burning easily.

### **PICTURE-II**

The picture shows an iron nail dipped in copper sulphate solution.

i) It is a displacement reaction because iron displaces copper from copper sulphate solution.

ii) The blue colour of copper sulphate solution gradually changes to light green due to the formation of iron sulphate.

A reddish-brown coating of copper is deposited on the iron nail.

iii)  $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$

iv) Copper is deposited on the iron nail.

This happens because iron is more reactive than copper and displaces copper from copper sulphate solution.

v) No reaction takes place. The green colour of iron(II) sulphate solution remains unchanged. This is because copper is less reactive than iron and cannot displace iron from its salt solution.

### **PICTURE-III**

The picture shows the reaction between baking soda and vinegar.

i)  $\text{NaHCO}_3 + \text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$

ii) It is an acid-base reaction (neutralization reaction) with evolution of gas.

iii) The gas produced is Carbon dioxide.

iv) On passing the gas through lime water, Lime water turns milky due to the formation of calcium carbonate.

v) Vinegar = Acetic acid , Baking soda = Sodium bicarbonate (Sodium hydrogen carbonate)

### QG.

Substance	Colour before heating	Colour of the residue	Name of the gas evolved	Name of the residue left
Copper carbonate	Green	Black	Carbon dioxide	Copper oxide
Lead nitrate	White	Yellow	Nitrogen dioxide and Oxygen	Lead oxide
Ammonium dichromate	Orange	Green	Nitrogen and steam	Chromium oxide
Zinc carbonate	White	Yellow when hot, white when cold	Carbon dioxide	Zinc oxide

**Q.H.** M has valency 3. Its

**i) Chloride**— $MCl_3$

**ii) Sulphate**— $M_2(SO_4)_3$

**iii) Hydroxide**— $M(OH)_3$

**iv) Phosphate**— $MPO_4$

v) **Oxide**— $M_2O_3$