

Note: You have four choices for each objective type questions as A, B, C and D. The choice which you think is correct fill that circle to front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1	QUESTIONS	(A)	(B)	(C)	(D)
1.	A reaction between an acid and base produces.	Salt & Water	Salt and Gas	Salt and Acid	Salt and Base
2.	The Conjugate acid of HPO_4 is	PO_4^{3-}	$\text{H}_2\text{PO}_4^{2-}$	H_2PO_4^-	H_3PO_4
3.	Which one of the following species is not amphoteric?	H_2O	NH_3	HCO_3^-	SO_4^{2-}
4.	Which one of the following is a Lewis base?	NH_3	BF_3	H^+	AlCl_3
5.	Acetic acid is used for.	Flavoring food	Making explosive	Etching designs	Cleaning metals.
6.	A hydrogen ion H^+ has electrons.	Zero	One	Two	Three
7.	Which one has strongest acid?	$\text{AlO}_2(\text{OH})$	$\text{ClO}_3(\text{OH})$	$\text{SO}(\text{OH})_2$	$\text{SO}_2(\text{OH})_2$
8.	Which One is Lewis acid?	FeCl_3	AlCl_3	BF_3	All of these
9.	Which one acid is present in the sting of honey bee?	Acetic acid	Citric Acid	Formic Acid	Tartaric Acid
10.	What is the difference between the conjugate acid-base pair is.	An electron	An electron pair	One proton	One neutron.
11.	If liquid has PH of 7 then it must	Be a colorless and order less Liquid.	Freeze 0°C and boils at 100°C	Be neutral	Be solution containing water.
12.	What is the POH of a 0.02 M $\text{Ca}(\text{OH})_2$?	1.698	1.397	12.31	12.61

A B C D

A B C D

A B C D

A B C D

A B C D

1	☒ B ☐ C ☐ D	4	☒ B ☐ C ☐ D	7	☐ A ☐ B ☐ C ☐ D	10	☐ A ☐ B ☒ C ☐ D	13	☐ A ☐ B ☐ C ☐ D
2	☐ A ☐ B ☒ C ☐ D	5	☒ B ☐ C ☐ D	8	☐ A ☐ B ☒ C ☐ D	11	☐ A ☐ B ☒ C ☐ D	14	☐ A ☐ B ☐ C ☐ D
3	☐ A ☐ B ☐ C ☒ D	6	☐ A ☐ B ☒ C ☐ D	9	☐ A ☐ B ☒ C ☐ D	12	☐ A ☒ B ☐ C ☐ D	15	☐ A ☐ B ☐ C ☐ D

نوٹ: معروضی سوال نمائے کو توجہ سے پڑھیں اور ہر MCQ کی درست آپشن A, B, C, D کو چنیں کی سی ای یا مار کر سے اس طرح پُر کریں کہ سی ای دائرے سے باہر نہ نکلے۔ ایک سے زیادہ دائروں کو پُر کرنے یا کاٹ کر پُر کرنے کی صورت میں مذکورہ جواب غلط تصور ہوگا۔

TEST NO. 2
CH NO. 10

CLASS-10TH

CHEMISTRY

Time Allowed: 1:45 hours

Maximum

Marks: 48

(PART – I)

- 2. Write any five short parts of the following. 10**
- (i) Define a base and explain all alkalies are bases, but all bases are not alkalies.
 - (ii) Which kind of bond forms between Lewis acid and a base.
 - (iii) Name two acids used in the manufacture of fertilizers.
 - (iv) Define Bronsted-Lowry base and explain with an example that water is a Bronsted-Lowry base.
 - (v) Define pH. What is the pH of pure water?
 - (vi) Why H^+ ion acts as a Lewis acid?
 - (vii) Name an acid used in the preservation of food.
 - (viii) How are the insoluble salts prepared?
- 3. Write any five parts of the following. 10**
- (i) Give the few characteristics properties of salts.
 - (ii) How many times a solution of pH 1 will be stronger than that of a solution having Ph2?
 - (iii) Define Normal salt and Basic salt.
 - (iv) How can you justify that $Ph(OH)NO_3$ is a basic salt?
 - (v) Which salt is used to prepare plaster of Paris?
 - (vi) You are in a need of an acidic salt. How can you prepare it?
 - (vii) Na_2SO_4 is a neutral salt while $NaHSO_4$ is an acid salt. Justify.
 - (viii) Write two uses of Base.
- 4. Write any five parts of the following. 10**
- (i) Define amphoteric.
 - (ii) What is the difference between Arrhenius base and Bronsted-Lowry base?
 - (iii) What is the function of HCL in stomach?
 - (iv) Write two uses of pH.
 - (v) Define Indicator.
 - (vi) Define Salt and two uses of salt.
 - (vii) Write down two natural acid and their sources.
 - (viii) Differentiate between 'p' and pH.

(PART – II)

Note: -Attempt any Two questions of the following.

- 5. (a) Explain the Lewis concept of acids and bases. 5**
(b) Write down Chemical properties of Acids. 4
- 6. (a) Define salt types of salt and different between Normal ,Acidic and Basics salt. 5**
(b) Complete and balance the following equations. 4
a) Aluminum + Hydrochloride acid.
b) Copper oxide + Sulphoric acid.
c) Ferric Chloride + Sodium Hydroxide
- 7. (a) What is the meant by PH. Give its uses. 5**
(b) Write a note on indicator? 4

CHEMISTRY

(PART - I)

Question : 2

Write any five parts of the following.

- (i) Define a base and explain all alkalines are bases, but all bases are not alkalines.

Base :-

A species that

- (a) release OH^- in aqueous solution
- (b) accept a proton
- (c) donate electron pair called base.

Alkali :-

A soluble base called alkali. It gives hydroxides ions in solutions. So, all alkalis are bases but all bases are not alkalis.

- (ii) Which kind of bond forms between Lewis acid and a base?

A coordinate bond is formed between Lewis acid and base. In this type of bond shared pair of

electrons donated by only one atom to other.

(iii) Name two acids used in the manufacture of fertilizers.

Nitric acid (HNO_3) and Sulphuric acid (H_2SO_4) are used in manufacture of fertilizers.

(iv) Define Bronsted - Lowry base and explain with an example that water is a Bronsted - Lowry base.

According to Bronsted - Lowry concept:
Acid:

Proton donor species are known as acids.

Base:

Protons acceptor species are known as bases.

Example:



Acid

Base

conjugate
acid

conjugate
base

So water accepts proton from hydrochloric to form hydronium ion called Bronsted - Lowry base.

(V) Define pH. What is the pH of pure water?

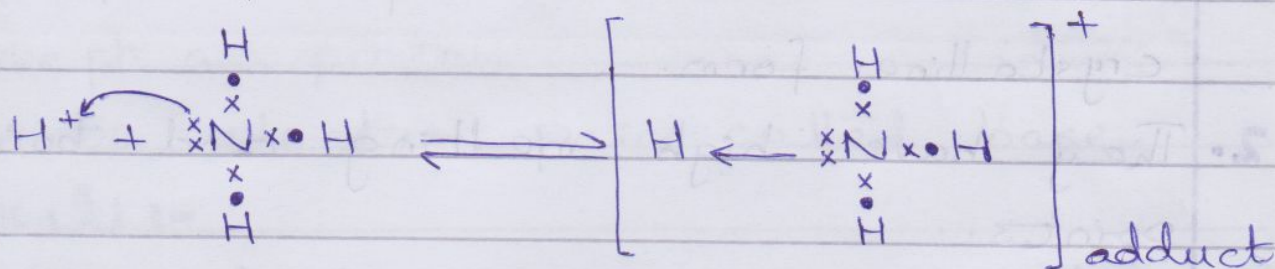
It is negative logarithm of hydrogen ion.

$$\text{pH} = -\log[\text{H}^+]$$

pH of water is 7.

(Vi) Why H^+ ion acts as a Lewis acid?

H^+ is an electron deficient. It has empty orbital. It completes its valence shell with two electrons. So, it is an electrophiles as:



(Vii) Name an acid used in the preservation of food.

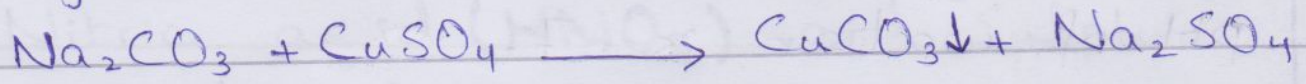
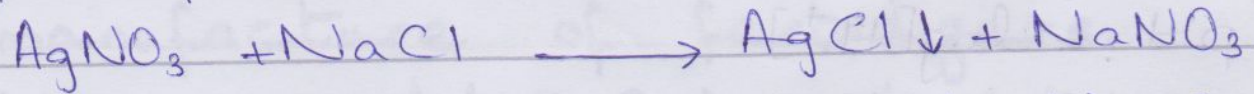
1- Benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$)

2- Acetic acid (CH_3COOH)

(Viii) How are the insoluble salts prepared?

Insoluble salts are prepared by mixing solutions of soluble salts.

During this reaction exchange of radicals take place to produce two new salts. So, insoluble salt is precipitates out. It is shown as:



Question : 3

Write any five parts of the following.

(i) Give the few characteristics of salts. Properties

1. Salts are ionic compounds found in crystalline form.
2. They have high melting and boiling points.
3. Salts are neutral compounds.

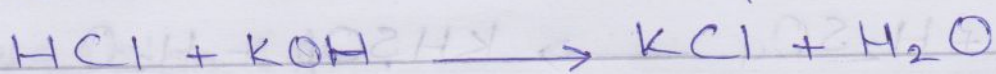
(ii) How many times a solution of pH 1 will be stronger than that of a solution having pH 2?

A solution of pH 1 has 10 times higher concentration of H^+ than that of a solution of pH 2.

(iii) Define Normal salt and Basic salt.

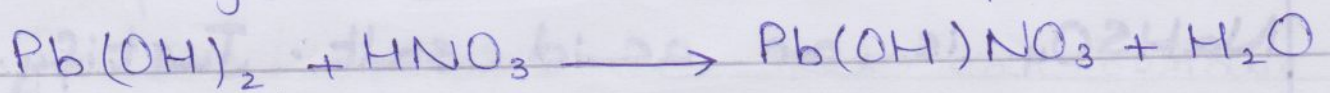
Normal Salt :-

A salt formed by total replacement of ionizable H^+ ions of an acid by a positive metal ion is called normal or neutral salt. For example



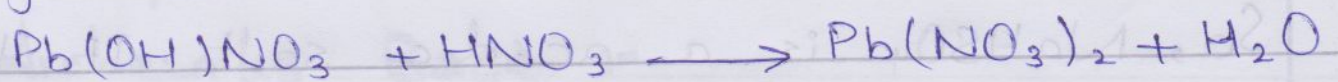
Basic Salt :-

Basic salts are formed by the incomplete neutralization of polyhydroxy base by an acid. For example



(iv) How can you justify that $Pb(OH)NO_3$ is a basic salt?

$Pb(OH)NO_3$ has replaceable hydroxide ion which is a indication of basic salt. This hydroxide ion is neutralized by an acid. Such as:



(v) Which salt is used to prepare plaster of Paris?

Calcium sulphate or gypsum

$(CaSO_4 \cdot 2H_2O)$ is used to prepare

plaster of Paris.

(Vi) You are in a need of an acidic salt. How can you prepare it?

Acidic salt is prepared by partial neutralization of an acid with a base.

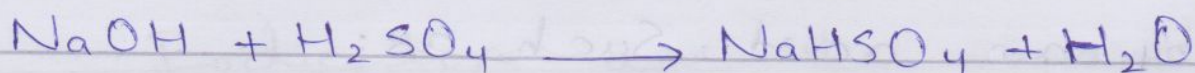


So, KHSO_4 is acidic salt. It has replaceable hydrogen ion.

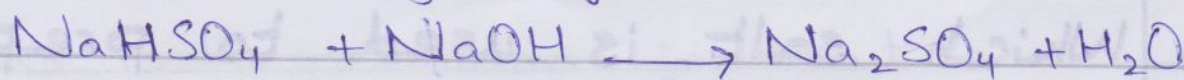
(Vii) Na_2SO_4 is a neutral salt while NaHSO_4 is an acid salt. Justify.

Na_2SO_4 is formed by complete replacement of H^+ ions from an acid. While NaHSO_4 is formed by partial replacement of H^+ ions of an acid.

Examples:



So, NaHSO_4 is a acidic salt. It has replaceable hydrogen ion.



(Viii) Write two uses of Base.

1. Sodium Hydroxide :-

Sodium hydroxide is used for manufacturing of soap.

2. Potassium Hydroxide :-

Potassium hydroxide is used in alkaline batteries.

Question : 4

i Write any five parts of the following.

(i) Define amphoteric.

Amphoteric :-

A substance that can behave as an acid as well as, a base is called amphoteric. Water is an amphoteric specie.

(ii) What is the difference between Arrhenius base and Bronsted-Lowry base?

Arrhenius Base :-

Base is substance which dissociates in aqueous solution to give hydroxide ions. For example NaOH .

Bronsted-Lowry Base :-

Base is a substance that can

accept a proton (H^+) from another substance. For example NH_3 .

(iii) What is the function of HCl in stomach?

We all have a little concentration of hydrochloric acid in our stomach, which helps to break down the food.

(iv) Write two uses of pH.

Uses of pH :-

1. It is used to determine acidic or basic nature of a solution.
2. It is used to prepare medicine, culture at microbiological particular concentration of H^+ ion.

(v) Define indicator.

Indicator :-

Indicators are the organic compounds. They have different colours in acidic and alkaline solutions.

Litmus is a common indicator.

(vi) Define salt and two uses of salt.

Salt :-

Salts are ionic compounds generally formed by the neutralization of an acid with a base.

Uses of salt :-

- 1- Sodium chloride is used as table salt and for cooking purposes.
- 2- Sodium sulphate is used for the manufacture of glass, paper and detergents.

(Vii) Write down two natural acid and their sources.

Natural Acids	Sources
1- Citric acid	Citrus fruits
2- Lactic acid	Sour milk

(Viii) Differentiate between "p" and "pH".

pH is negative logarithm of concentration of H^+ ion i.e., $pH = -\log [H^+]$ while "p" scale is the conversion of very small figures into positive figures by taking common logarithm of the small figure and multiply it with 10.

(PART - II)

Attempt any two questions of the following.

Question : 5(a)

Explain the Lewis concept of acids and bases.

Lewis Acids:-

According to Lewis concept following species can act as Lewis acids:

(i) Molecules with Incomplete Octet:

Molecules in which central atom has incomplete octet are called Lewis acids.

Examples:

1. BF_3 (Boron Trifluoride)

2. AlCl_3 (Aluminium chloride)

3. FeCl_3 (Ferric chloride)

Central atom B, Al, Fe has six electrons around it so, they accept a pair of electrons to complete octet.

(ii) Simple Cations as a Lewis Acids:

Simple cations are deficient of electrons so, they act as Lewis

acids.

Examples:

- 1- Na^+ (Sodium ions)
- 2- K^+ (Potassium ions)
- 3- Ca^{+2} (Calcium ions)
- 4- H^+ (Hydrogen ions)
- 5- Ag^+ (Silver ions)

Na^+ , K^+ , Ca^{+2} has little tendency to accept a lone pair while H^+ , Ag^+ have greater tendency to accept electron pair.

Lewis Bases :-

According to Lewis concept the following species can act as Lewis bases:

(i) Electron Rich Species are Bases:

Species having lone pair of electrons are Lewis bases.

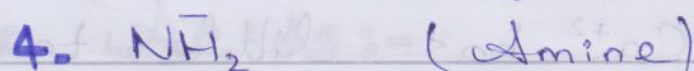
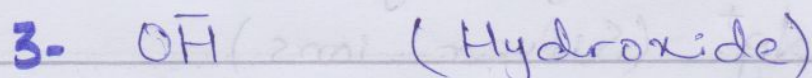
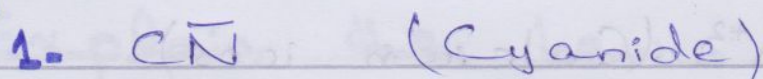
Examples:

- 1- NH_3 (Ammonia)
- 2- $\text{R}-\text{NH}_2$ (Alkyl amine)
- 3- $\text{R}-\text{OH}$ (Alcohol)
- 4- $\text{R}-\text{O}-\text{R}$ (Ether)
- 5- $\text{H}-\text{O}-\text{H}$ (Water)

(ii) Anions are Lewis Bases :

Negative species called anions are Lewis bases.

Examples :



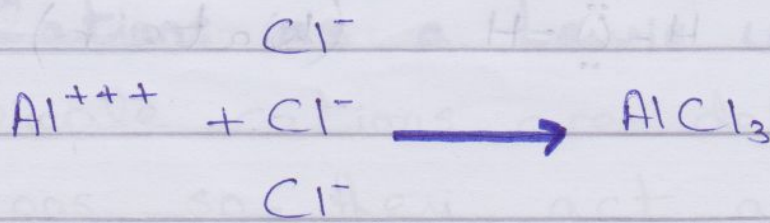
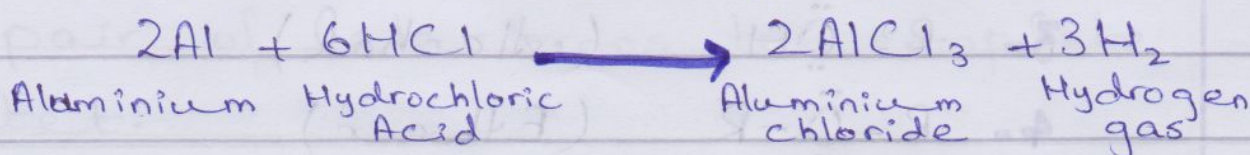
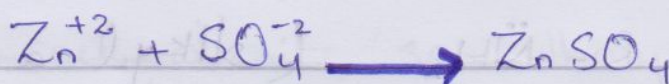
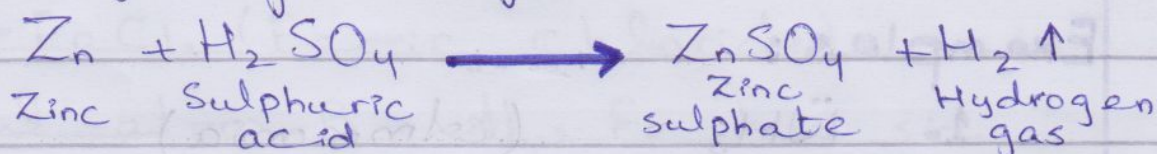
Question : 5(b)

Write down chemical properties of acids.

Chemical Properties :-

(i) Reaction with Metals :

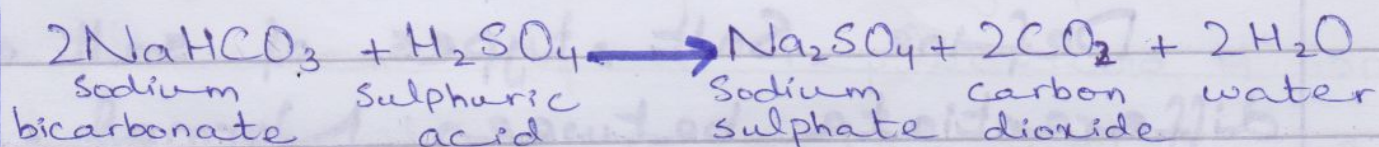
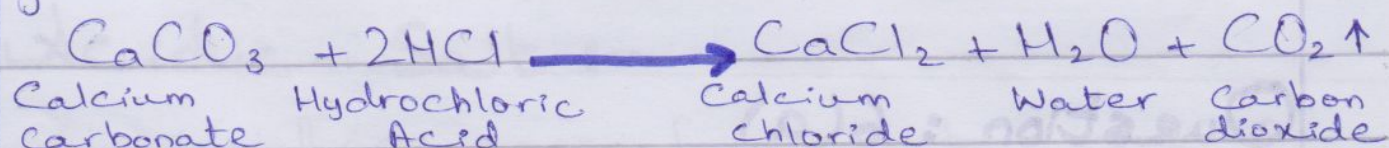
When metals react with acids they form respective salts and evolve hydrogen gas.



- Sodium (Na), Potassium (K) and Calcium (Ca) react violently with acids.
- Metals like Mg, Zn, Fe, Al react moderately with dilute acids.

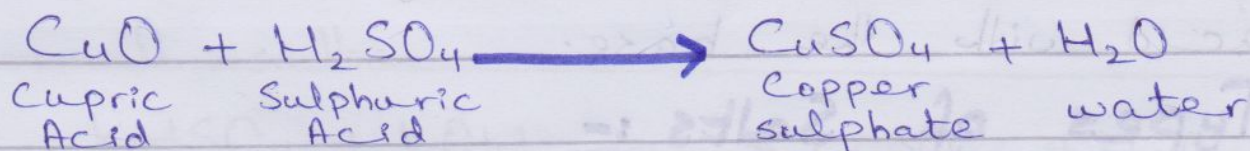
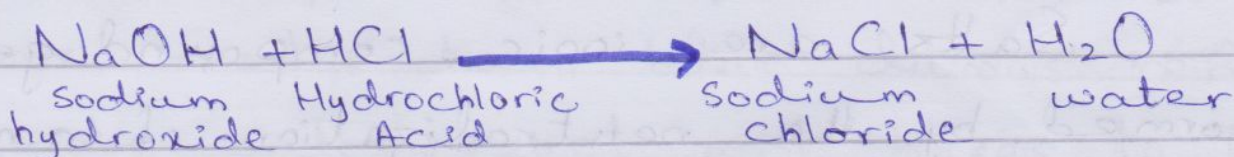
(iii) Reaction with Carbonates and Bicarbonates:

When metal carbonates and bicarbonates react with acids they form salt, water and carbon dioxide gas.



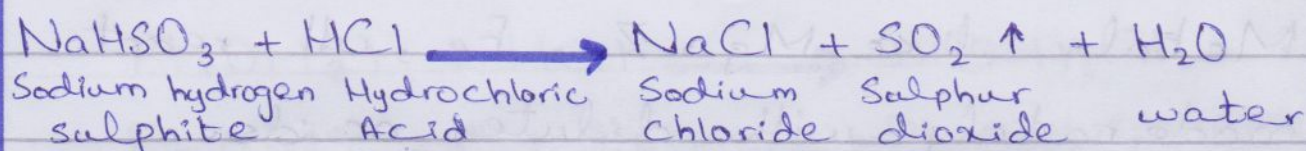
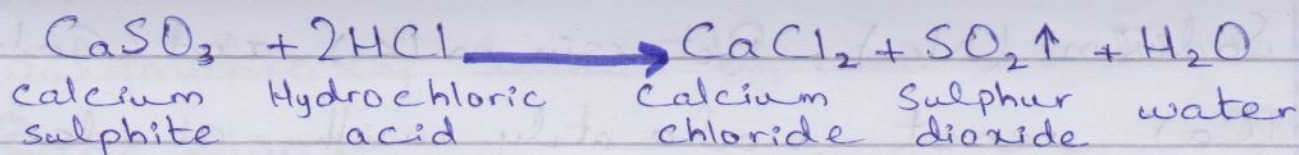
(iii) Reaction with Bases:

When acid reacts with base ^{if} it forms salt and water.



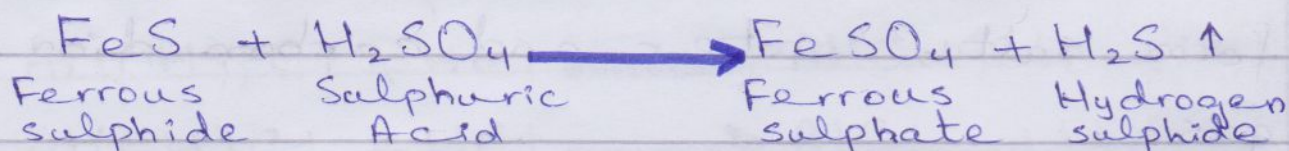
(iv) Reaction with Sulphites and Bisulphites:

Metals sulphites and bisulphites react with acids form respective metal salt, water and sulphur dioxide gas.



(N) Reaction with Sulphides:

When metal sulphides react with acid they form sulphates and liberate hydrogen sulphides.



Question : 6(a)

Define Salt, types of salt and differentiate between Normal, acidic and Basic salt.

Salt :-

Salts are ionic compound generally formed by the neutralization of an acid with the base.

Types of Salts :-

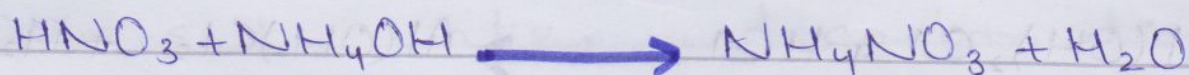
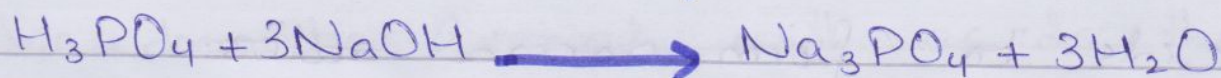
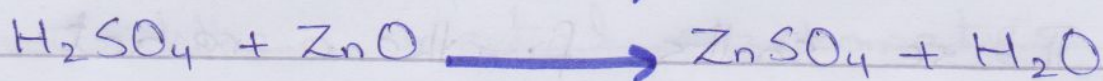
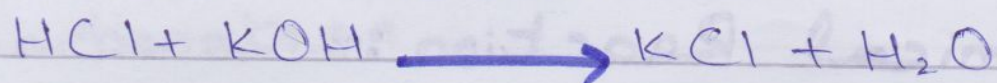
- 1- Normal salts
- 2- Basic salts
- 3- Mixed salts
- 4- Acidic salts
- 5- Double salts
- 6- Complex salts

1- Normal Salts :-

A salt formed by the complete

replacement of ionizable H^+ ion of an acid by a positive metal ion or NH_4^+ ion is called normal or neutral salt. These salts are neutral or litmus.

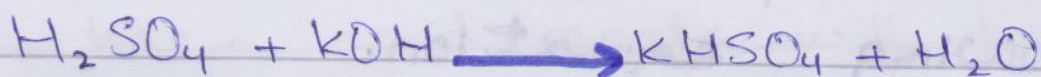
Chemical Reaction :-



2. Acidic Salt :-

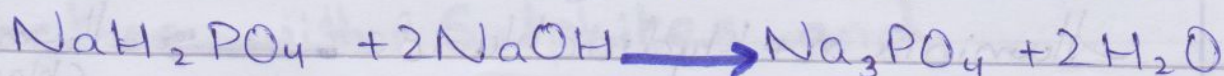
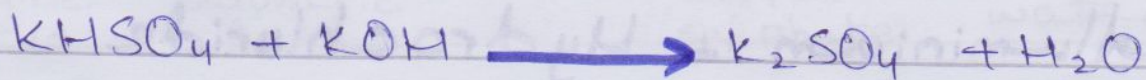
These are formed by partial replacement of a replaceable H^+ ions of an acid by a positive metal ion.

Reaction :-



These salts turn blue litmus red.

Acidic salts react with bases to form normal salts.

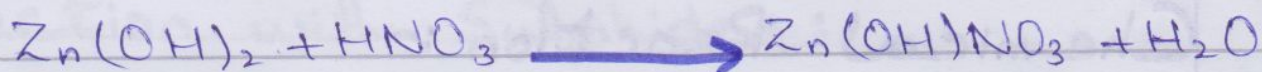
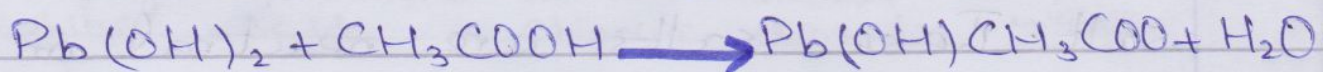


3. Basic Salts :-

Basic salts are formed by the incomplete neutralization of a

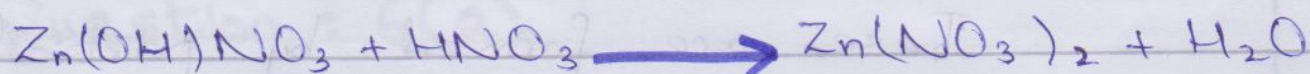
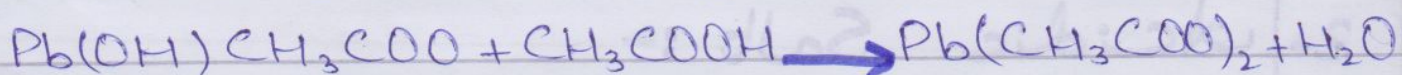
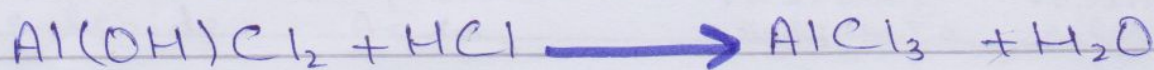
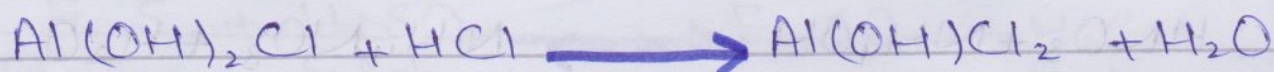
polyhydroxy base by an acid.

Reaction:-



Chemical Reaction:-

These salts further react with acids to form normal salts.



Question: 6(b)

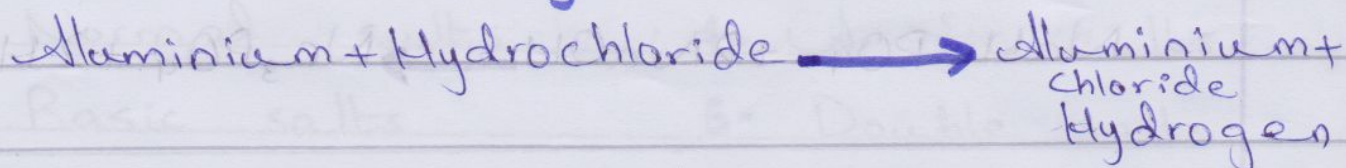
Complete and balance the following equation.

a) Aluminium + Hydrochloride

b) Copper oxide + Sulphuric acid

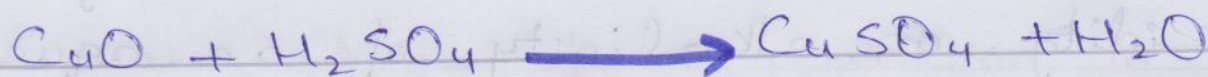
c) Ferric chloride + Sodium hydroxide

a) Aluminium + Hydrochloride



b) Copper oxide + Sulphuric acid

Copper oxide + Sulphuric acid $\longrightarrow$ Copper sulphate + Water



c) Ferric chloride + Sodium hydroxide

Ferric chloride + Sodium hydroxide $\longrightarrow$ Ferric hydroxide + Sodium chloride



Question : 7(a)

What is meant by pH. Give its uses.

pH of Solution :-

"The negative logarithm of the hydrogen ion concentration of a solution is called pH."

Mathematically, pH can be written as

$$\text{pH} = -\log [\text{H}^+]$$

pH Scale :-

"With reference to equation $\text{pH} = -\log [\text{H}^+]$ a scale developed according to molar concentration of hydrogen ion $[\text{H}^+]$ that is called

pH scale."

OR

"The scale on which the degree of acidity or alkalinity of an aqueous solution is measured is called the pH scale."

pH scale ranges from 0 to 14. So, sum of pH and pOH of the solution is always 14 at 25°C. Such as

$$\text{pH} = -\log [1.0 \times 10^{-7}] = 7$$

$$\text{pOH} = -\log [1.0 \times 10^{-7}] = 7$$

$$\text{pH} + \text{pOH} = 14$$

Uses of pH :-

- 1- It is used to determine acidic or basic nature of a solution.
- 2- It is used to produce medicines, culture at a microbiological particular concentration of H^+ ion.
- 3- It is used to prepare solutions of required concentrations necessary for certain biological reactions.

Question: 7(b)

Write a note on indicator?

Indicators :-

"Indicators are the organic compounds. These compounds indicate the completion of a reaction in titration by the change in its colour. These help in determining the acidic, basic and neutral nature of solution."

Explanation :-

Indicators have different colours in acidic and alkaline solutions. There are different types of indicators. Some of indicators are given below:

- 1- Litmus
- 2- Phenolphthalein
- 3- Methyl orange

Litmus :-

- (a) Blue litmus turns into red in acidic solution.
- (b) Red litmus turns into blue in alkaline solution.

Phenolphthalein :-

- (a) It is colourless in strongly acidic solution.
- (b) It is red in strongly alkaline solution.
- (c) It changes colour at a pH about 9.

(d) Phenolphthalein is colourless in solution with pH less than 9.

Methyl orange :-

(a) It gives red colour at pH 4.

(b) It gives yellow colour from pH 4.

Few commonly used indicators in titrations are given table below:

Indicator	Colour in strongly acid solution	pH at which colour changes	Colour in strongly alkaline solution
Methyl orange	Red	4	Yellow
Litmus	Red	7	Blue
Phenolphthalein	Colourless	9	Red