CLASS 10TH CHEMISTRY WORKSHEET CHAPTER – ANALYTICAL CHEMISTRY

Intext Questions 1

Question 1

What do you understand by the following:

(a) Analysis

(b) Qualitative analysis

(c) Reagent

(d) Precipitation

Answer

(a) Analysis — Determination of the chemical components in a given sample is called **Analysis**.

(b) Qualitative analysis — Identification of the unknown substances in a given sample is called **Qualitative analysis**.

(c) Reagent — A **reagent** is a substance that reacts with another substances.

(d) Precipitation — The process of formation of an insoluble solid when solutions are mixed is called Precipitation. The solid thus formed is called **Precipitate**.

Question 2

Write the probable colour of the following salts:

(a) Iron (III) chloride

(b) Potassium nitrate

(c) Ferrous sulphate

(d) Aluminium acetate

Answer

(a) Iron (III) chloride — Yellow

(b) Potassium nitrate — Colourless

(c) Ferrous sulphate — Pale Green

(d) Aluminium acetate — Colourless

Question 3

Name the probable cation present based on the following observations:

(a) White precipitate insoluble in NH_4OH but soluble in NaOH.

(b) Blue coloured solution.

Answer

(a) Pb^{2+}

(b) Cu^{2+}

Question 4

Name the metal hydroxides which are:

(a) Insoluble

(b) Soluble

in

(i) caustic soda solution

(ii) Ammonium hydroxide solution

Answer

Name of the solution	Soluble metal hydroxide	Insoluble metal hydroxide
Caustic soda solution	$Zn(OH)_2$, $Pb(OH)_2$	$Fe(OH)_2$, $Fe(OH)_3$, $Cu(OH)_2$
Ammonium hydroxide solution	$Zn(OH)_2$, $Cu(OH)_2$	$Fe(OH)_2$, $Fe(OH)_3$, $Pb(OH)_2$

Question 5

What do you observe when ammonium salt is heated with caustic soda solution? Write the word equation:

Answer

When ammonium salt is heated with caustic soda solution, ammonia gas is evolved.

The word equation is:

Ammonium Salt + Sodium Hydroxide $\xrightarrow{\Delta}$ Sodium Salt + Water + Ammonia Gas

Question 6

How will you distinguish NH_4OH solution from NaOH solution?

Answer

NH_4OH and NaOH can be distinguished by using $CuSO_4$.

$CuSO_4$ forms a **pale blue precipitate which is insoluble in excess of sodium hydroxide** and with ammonium hydroxide it forms a **pale blue precipitate which dissolves in excess of ammonium hydroxide and forms a deep/inky blue solution.**

$$CuSO4blue + 2NaOHcaustic\ soda\ -\ colourless \longrightarrow Cu(OH)2pale\ blue\ ppt \downarrow + Na2SO4colourless$$

$$CuSO4blue + 2NH_4OH \longrightarrow Cu(OH)2pale\ blue\ ppt \downarrow + (NH4)2SO4colourless\ in\ solution$$

$$Cu(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow [(Cu(NH3)4]SO4Tetraamminecopper\ (II)\ sulphate + 4H_2O$$

Question 7

Why the alkali is added drop by drop to the salt solution?

Answer

If an alkali is added too quickly, then it is easy to miss a precipitate that redissolves in excess alkali.

Question 8

Write balanced equation:

(a) Reaction of sodium hydroxide solution with Iron (III) chloride solution

(b) Copper sulphate solution with ammonium hydroxide solution

Answer

(a) When sodium hydroxide solution is added to $FeCl_3$ dropwise, a reddish brown ppt is obtained, which is insoluble in excess of NaOH:

$$FeCl3Yellow + 3NaOHColourless \longrightarrow Fe(OH)3 \downarrow Reddish\ brown\ ppt + 3NaClColourless$$

(b) When ammonia solution is added dropwise to cupper sulphate, a pale blue ppt of copper hydroxide is obtained.

$$CuSO4Blue + 2NH_4OH \longrightarrow Cu(OH)2Pale\ Blue\ ppt \downarrow + (NH4)2SO4Colourless\ in\ solution$$

On adding excess of ammonia solution, the ppt dissolves and a deep blue solution is obtained.

$$Cu(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow [(Cu(NH3)4]SO4Tetraammine\ copper\ (II)\ sulphate + 4H_2O$$

Exercise 4 — Multiple Choice Type

Question 1

The colour of an aqueous solution of copper sulphate is:

1. Green
2. Brown
3. Blue
4. Yellow

Answer

Blue

Reason — Aqueous solution of copper sulphate is blue.

Question 2

The colour of the precipitate formed on adding NaOH solution to iron (II) sulphate solution is:

1. White
2. Brown

3. Green
4. Pale blue

Answer

Green

Reason — Dirty green precipitate of Ferrous Hydroxide [$Fe(OH)_2$] is formed.

Question 3

A metal which produces hydrogen on reacting with alkali as well as with acid:

1. Iron
2. Magnesium
3. Zinc
4. Copper

Answer

Zinc

Reason — Reactions of Zinc with alkali and acid are shown below:

$Zn + 2NaOH \longrightarrow Na_2(ZnO)_2 + H_2\uparrow$

$Zn + HCl \longrightarrow ZnCl_2 + H_2\uparrow$

Question 4

The salt solution which does not react with ammonium hydroxide is:

1. Calcium nitrate
2. Zinc nitrate
3. Lead nitrate
4. Copper nitrate

Answer

Calcium Nitrate

Reason — No ppt. occurs even with addition of excess of ammonium hydroxide as the concentration of OH^- ions from the ionization of of NH_4OH is so low that it cannot precipitate the hydroxide of calcium.

Question 5

Which of the following is the best reagent to distinguish lead nitrate and zinc nitrate ?

P NaOH solution

Q KOH solution

R NH_4OH solution

1. Only P
2. Only R
3. Only Q
4. Both P and Q

Answer

Both P and Q

Reason — On adding NaOH or KOH to lead nitrate, a white precipitate of lead hydroxide [$Pb(OH)_2$] is formed, which is **insoluble** in excess NaOH or KOH.

On adding NaOH or KOH to zinc nitrate, a white precipitate of zinc hydroxide [$Zn(OH)_2$] is formed, which is **soluble** in excess NaOH or KOH, forming a clear solution.

Even though NH_4OH can separate the two, it is not the most effective reagent because, although it produces a white precipitate with both, lead hydroxide does not dissolve in excess NH_4OH, while zinc hydroxide does.

Question 6

Assertion (A): Calcium salt solution does not show any change even after adding an excess of ammonia solution to it.

Reason (R): The low concentration of hydroxide ion in ammonium hydroxide solution which are unable to precipitate the hydroxide ions of calcium

1. Both A and R are true and R is the correct explanation of A.

2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

Answer

Both A and R are true and R is the correct explanation of A.

Explanation — Calcium salt will not show precipitation even with addition of excess of NH_4OH. This is because the concentration of OH^- ions from the ionization of NH_4OH is so low that it cannot precipitate the hydroxide of calcium. Hence both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Question 7

Assertion (A): Iron (II) salt solution when reacted with ammonium hydroxide forms a dirty green precipitate.

Reason (R): Iron salts are brown in colour.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

Answer

A is true but R is false.

Explanation — When Iron (II) salt (Green colour) solution are reacted with ammonium hydroxide, a dirty green insoluble precipitate is formed. Hence the assertion (A) is true.

$$\mathrm{FeSO4green} + 2\mathrm{NH_4OH} \longrightarrow \mathrm{Fe(OH)2} \downarrow \text{dirty green ppt} + \mathrm{(NH4)2SO4colourless\ in\ solution}$$

Iron (II) salts are Green and Iron (III) salts are yellow in colour so reason (R) is false.

Question 8

Assertion (A): Hydrogen gas is liberated when metals like Zn, Al, Pb react with caustic alkalies.

Reason (R): Alkalies are soluble in water.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

Answer

Both A and R are true but R is not the correct explanation of A.

Explanation — Certain metals like zinc, aluminium and lead react with hot concentrated caustic alkalis (NaOH, KOH) to give the corresponding soluble salt and liberate hydrogen.

$$\mathrm{Zn} + 2\mathrm{NaOHhot\ and\ conc.} \longrightarrow \mathrm{Na2ZnO2sodium\ zincatecolourless} + \mathrm{H_2} \uparrow$$
$$\mathrm{Zn} + 2\mathrm{KOHhot\ and\ conc.} \longrightarrow \mathrm{K2ZnO2potassium\ zincatecolourless} + \mathrm{H_2} \uparrow$$

Hence the assertion (A) is true.

Alkalis are bases that are soluble in water. When dissolved in water, alkalis release hydroxide ions (OH^-), making the solution basic (pH > 7). Hence reason (R) is true but it does not support assertion (A).

Question 9

Assertion (A): Oxides of most of the metals are basic in nature.

Reason (R): All metal oxides dissolve in water forming alkalis.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

Answer

A is true but R is false.

Explanation — Oxides of most of the metals are basic in nature. They dissolve in water forming hydroxides (or alkalis).

For example:

$$Na2Osodium\ oxide + H_2O \longrightarrow 2NaOHsodium\ hydroxide$$

Hence the assertion (A) is true.

Reason (R) is false because, not all metal oxides dissolve in water to form alkalis. A few metallic oxides and hydroxides exhibit dual character, i.e., they show acidic as well as basic character. They are said to be amphoteric in nature.

For example : Copper(II) oxide (CuO)

$CuO + H_2O \longrightarrow$ **No reaction**

Question 10

Assertion (A): Zinc oxide reacts with acids as well as bases to form salt and water.

Reason (R): Zinc oxide is amphoteric in nature.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

Answer

Both A and R are true and R is the correct explanation of A.

Explanation — Zinc oxide reacts with both acids and concentrated alkalis (NaOH and KOH) forming salt and water.

$ZnO + 2HCl \longrightarrow ZnCl_2 + H_2O$

$ZnO + 2NaOH \longrightarrow Na_2ZnO_2 + H_2O$

Hence the assertion (a) is true.

Reason (R) is true because zinc oxide is amphoteric in nature, reacts with both acids and concentrated alkalis forming salt and water. Hence Both A and R are true and reason (R) is the correct explanation of assertion(A).

Exercise 4 — Very Short Answer Type

Question 1

Name:

(a) two coloured metal ions.

(b) a metal that evolves a gas which burns with a pop sound when boiled with alkali solutions.

(c) two bases which are not alkalis but dissolve in strong alkalis.

(d) a coloured metallic oxide which dissolves in alkalis to yield colourless solutions.

(e) a colourless cation not a representative element.

(f) a yellow monoxide that dissolves in hot and concentrated caustic alkali.

(g) a white, insoluble oxide that dissolves when fused with caustic soda or caustic potash.

(h) a compound containing zinc in the anion.

Answer

(a) Cupric ion [Cu^{2+}], Ferrous ion [Fe^{2+}]

(b) Aluminium [Al]

(c) Zinc hydroxide [$Zn(OH)_2$] and Lead hydroxide [$Pb(OH)_2$]

(d) Lead oxide [PbO]

(e) Ammonium ion [NH_4^+]

(f) Lead oxide [PbO]

(g) Zinc oxide [ZnO]

(h) Potassium Zincate [K_2ZnO_2]

Question 2

Write the probable colour of the following salts?

(a) Ferrous salts

(b) Ammonium salts

(c) Cupric salts

(d) Calcium salts
(e) Aluminium salts

Answer

(a) Ferrous salts — Pale Green
(b) Ammonium salts — Colourless
(c) Cupric salts — Blue
(d) Calcium salts — Colourless
(e) Aluminium salts — Colourless

Exercise 4 — Short Answer Type

Question 1

Name the chloride of a metal which is soluble in excess of ammonium hydroxide. Write equation for the same.

Answer

Zinc chloride ($ZnCl_2$) is soluble in excess of ammonium hydroxide.

When ammonia solution is added dropwise to zinc chloride solution, a white gelatinous ppt of zinc hydroxide is obtained.

$$\text{ZnCl2colourless solution} + 2NH_4OH \longrightarrow \text{Zn(OH)2} \downarrow \text{white gelatinous ppt} + 2NH_4Cl$$

On adding excess of ammonia solution, the ppt dissolves and a colourless solution is obtained.

$$Zn(OH)_2 + 2NH_4Cl + 2NH_4OH \longrightarrow \text{[(Zn(NH3)4]Cl2Tetraamminezinc (II) sulphate} + 4H_2O$$

Question 2

What happens when ammonia solution is added first dropwise and then in excess to the following solutions:
(i) $CuSO_4$
(ii) $ZnSO_4$
(iii) $FeCl_3$
Write balanced equations for these reactions.

Answer

(i) When ammonia solution is added dropwise to cupper sulphate, a pale blue ppt of copper hydroxide is obtained.

$$\text{CuSO4blue} + 2NH_4OH \longrightarrow \text{Cu(OH)2pale blue ppt} \downarrow + \text{(NH4)2SO4colourless in solution}$$

On adding excess of ammonia solution, the ppt dissolves and a deep blue solution is obtained.

$$Cu(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow \text{[(Cu(NH3)4]SO4Tetraamminecopper (II) sulphate} + 4H_2O$$

(ii) When ammonia solution is added dropwise to zinc sulphate, a white gelatinous ppt of zinc hydroxide is obtained.

$$\text{ZnSO4colourless solution} + 2NH_4OH \longrightarrow \text{Zn(OH)2} \downarrow \text{white gelatinous ppt} + \text{(NH4)2SO4colourless in solution}$$

On adding excess of ammonia solution, the ppt dissolves and a colourless solution is obtained.

$$Zn(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow \text{[(Zn(NH3)4]SO4Tetraamminezinc (II) sulphate} + 4H_2O$$

(iii) When ammonia solution is added dropwise to iron (III) chloride, a reddish brown ppt. of $Fe(OH)_3$ is obtained.

$$\text{FeCl3yellow solution} + 3NH_4OH \longrightarrow \text{Fe(OH)3} \downarrow \text{reddish brown ppt} + \text{3NH4Clcolourless in solution}$$

Excess of ammonia solution addition doesn't dissolve ppt.

Question 3

What do you observe when caustic soda solution is added to the following solution, first a little and then in excess :
(a) $FeCl_3$
(b) $ZnSO_4$
(c) $Pb(NO_3)_2$
(d) $CuSO_4$
Write balanced equations for these reactions.

Answer

(a) When caustic soda solution is added to $FeCl_3$ dropwise, a reddish brown ppt is obtained, which is insoluble in excess of NaOH:

$$\text{FeCl3yellow} + \text{3NaOHcolourless} \longrightarrow \text{Fe(OH)3} \downarrow \text{reddish brown ppt} + \text{3NaClcolourless}$$

(b) When caustic soda solution is added to Zinc sulphate dropwise, a white gelatinous ppt is obtained, which dissolves in excess of NaOH:

$$ZnSO4colourless + 2NaOHcolourless \longrightarrow Zn(OH)2 \downarrow white\ gelatinous\ ppt + Na2SO4\ colourless$$

$$Zn(OH)_2 + 2NaOH\ excess \longrightarrow Na2ZnO2 \downarrow colourless + 2H_2O$$

(c) When caustic soda solution is added to $Pb(NO_3)_2$ dropwise, a chalky white ppt is obtained, which dissolves in excess of NaOH:

$$Pb(NO3)2colourless + 2NaOHcolourless \longrightarrow Pb(OH)2 \downarrow white\ ppt + 2NaNO3\ colourless$$

$$Pb(OH)_2 + 2NaOHexcess \longrightarrow Na2PbO2 \downarrow sodium\ plumbite\ -\ colourless + 2H_2O$$

(d) When caustic soda solution is added to $CuSO_4$ dropwise, a pale blue ppt is obtained, which is insoluble in excess of NaOH:

$$CuSO4blue + 2NaOHcolourless \longrightarrow Cu(OH)2 \downarrow pale\ blue\ ppt + Na2SO4colourless$$

Question 4

What do you observe when freshly precipitated aluminum hydroxide reacts with caustic soda solution? Give balanced equation.

Answer

When freshly precipitated aluminum hydroxide reacts with caustic soda solution, a white soluble salt of sodium meta aluminate is obtained.

$Al(OH)_3 + NaOH \longrightarrow NaAlO_2$ [soluble] $+ 2H_2O$

Question 5

What is observed when hot concentrated caustic soda solution is added to

(a) Zinc

(b) Aluminium?

Write balanced equations.

Answer

(a) When hot concentrated caustic soda solution is added to zinc, soluble salt of sodium zincate [Na_2ZnO_2] is formed and hydrogen gas is liberated.

The balanced equation is:

$$Zn + 2NaOHhot\ and\ conc. \longrightarrow Na2ZnO2sodium\ zincatecolourless + H_2 \uparrow$$

(b) When hot concentrated caustic soda solution is added to aluminium, soluble salt of sodium meta aluminate [$NaAlO_2$] is formed and hydrogen gas is liberated.

$$2Al + 2NaOH + 2H_2O \longrightarrow 2NaAlO2sodium\ meta\ aluminatecolourless + 3H_2 \uparrow$$

Question 6

Distinguish by adding: Sodium hydroxide solution or ammonium hydroxide solution to

(a) Calcium salt solution and lead salt solution

(b) Lead nitrate solution and zinc nitrate solution

(c) Copper salt solution and ferrous salt solution

(d) Fe(II) salt solution and Fe(III) salt solution

(e) Ferrous nitrate and lead nitrate

Answer

(a) Ammonium hydroxide on reaction with lead salt solution gives chalky white precipitate of $Pb(OH)_2$. No precipitation occurs on adding Ammonium hydroxide to Calcium salt solution even when it is added in excess.

$$Pb(NO3)2colourless + 2NH_4OH \longrightarrow Pb(OH)2white\ ppt \downarrow + 2NH_4NO_3$$

(b) When ammonium hydroxide solution is added to each of the compounds, lead nitrate forms a chalky white precipitate of lead hydroxide [$Pb(OH)_2$] which is insoluble in excess of ammonium hydroxide.

$$Pb(NO3)2colourless + 2NH_4OH \longrightarrow Pb(OH)2white\ ppt \downarrow + 2NH_4NO_3$$

Whereas a gelatinous white precipitate of zinc hydroxide [$Zn(OH)_2$] is formed in case of zinc nitrate, which is soluble in excess of ammonium hydroxide.

$Zn(NO_3)_2 + 2NH_4OH \longrightarrow 2NH_4NO_3 + Zn(OH)_2 \downarrow$

(c) On adding Sodium hydroxide to Copper salt pale blue coloured precipitate is obtained which is insoluble in excess of Sodium hydroxide. Ferrous salt solution gives a dirty green coloured precipitate with Sodium hydroxide which is insoluble in excess of NaOH.

$$CuSO4blue + 2NaOHcolourless \longrightarrow Cu(OH)2 \downarrow \text{pale blue ppt} + Na2SO4colourless$$

$$FeSO4pale\ green + 2NaOHcolourless \longrightarrow Fe(OH)2 \downarrow \text{dirty green ppt} + Na2SO4colourless$$

(d) Sodium hydroxide on reaction with Fe(II) salt gives dirty green coloured precipitate, while with Fe(III) salt solution it forms reddish brown precipitate. Both precipitates are insoluble in excess NaOH.

Fe(II) salt:

$$FeSO4pale\ green\ solution + 2NaOH \longrightarrow Fe(OH)2 \downarrow \text{dirty green ppt} + Na2SO4colourless\ in\ solution$$

Fe(III) salt :

$$FeCl3yellow + 3NaOHcolourless \longrightarrow Fe(OH)3 \downarrow \text{reddish brown ppt} + 3NaClcolourless$$

(e) Ammonium hydroxide on reaction with lead nitrate gives a chalky white insoluble precipitate, and with ferrous nitrate forms a dirty green ppt.

$$Pb(NO3)2colourless + 2NH_4OH \longrightarrow Pb(OH)2 \downarrow \text{white ppt} + 2NH_4NO_3$$

$$Fe(NO3)2colourless + 2NH_4OH \longrightarrow Fe(OH)2 \downarrow \text{dirty green ppt} + 2NH4NO3\ colourless$$

Question 7

How will you distinguish calcium nitrate and zinc nitrate solution?

Answer

When ammonium hydroxide (NH_4OH) is added to zinc nitrate solution [$Zn(NO_3)_2$], a gelatinous white ppt of zinc hydroxide [$Zn(OH)_2$] is obtained which is soluble in excess of NH_4OH.

$$ZnSO4colourless\ solution + 2NH_4OH \longrightarrow Zn(OH)2 \downarrow \text{white gelatinous ppt} + (NH4)2SO4colourless\ in\ solution$$

(With excess NH_4OH ppt. dissolves)

$$Zn(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow [(Zn(NH3)4]SO4Tetraamminezinc\ (II)\ sulphate + 4H_2O$$

On the other hand, calcium nitrate solution [$Ca(NO_3)_2$] does not give any ppt. even when excess of ammonium hydroxide is added.

Exercise 4 — Long Answer Type

Question 1

You are provided with two reagent bottles marked A and B. One contains NH_4OH solution and the other contains NaOH solution. How will you identify them by a chemical test?

Answer

Reagent bottles A and B can identified by using $Ca(NO_3)_2$.

When NH_4OH solution is added to $Ca(NO_3)_2$ a white ppt is obtained.

$$Ca(NO3)2colourless + 2NaOHcaustic\ soda\ -\ colourless \longrightarrow Ca(OH)2white\ ppt \downarrow + 2NaNO3\ colourless$$

On the other hand, addition of NH_4OH solution to $Ca(NO_3)_2$ gives no precipitate even when NH_4OH solution is added in excess. Thus, $Ca(NO_3)_2$ can be used to distinguish between NH_4OH and NaOH solution.

Question 2

Write balanced equations for the following conversions:

(a) $Zn(SO)_4 \xrightarrow{A} Zn(OH)_2 \xrightarrow{B} Na_2ZnO_2$

(b) $Cu(SO)_4 \xrightarrow{A} Cu(OH)_2 \xrightarrow{B} [Cu(NH_3)_4]SO_4$

Answer

(a) When sodium hydroxide solution is added dropwise to zinc sulphate, a white gelatinous ppt of zinc hydroxide is obtained.

$$ZnSO4colourless + 2NaOHcolourless \longrightarrow Zn(OH)2white\ gelatinous\ ppt \downarrow + Na2SO4colourless$$

On adding excess of NaOH solution, the ppt dissolves and a colourless solution is obtained.

$$Zn(OH)_2 + 2NaOHexcess \longrightarrow Na2ZnO2sodium\ zincatecolourless + 2H_2O$$

(b) When ammonia solution is added dropwise to copper sulphate, a pale blue ppt of copper hydroxide is obtained.

$$CuSO4blue + 2NH_4OH \longrightarrow Cu(OH)2pale\ blue\ ppt \downarrow + (NH4)2SO4colourless\ in\ solution$$

On adding excess of ammonia solution, the ppt dissolves and a deep blue solution is obtained.

$$Cu(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow [(Cu(NH3)4]SO4 \text{tetraamminecopper (II) sulphate} + 4H_2O$$

Question 3

(a) What do you understand by amphoteric oxide?

(b) Give the balanced equations for the reaction with two different amphoteric oxides with a caustic alkali.

(c) Name the products formed.

Answer

(a) Amphoteric oxides and hydroxides are those compounds which react with both acids and alkalis to form salt and water.

(b) Balanced equations for the reaction of Zinc Oxide and Lead Oxide with Caustic Soda are given below:

$ZnO + 2NaOH \longrightarrow Na_2ZnO_2 + H_2O$

$PbO + 2NaOH \longrightarrow Na_2PbO_2 + H_2O$

(c) Sodium zincate [Na_2ZnO_2] and sodium plumbite [Na_2PbO_2] are the products formed.

Question 4

On adding dilute ammonia solution to a colourless solution of a salt, a white gelatinous precipitate appears. This precipitate however dissolves on addition of excess of ammonia solution.

(a) From the following list, identify which metal salt solution was used above?

Na, Al, Zn, Pb, Fe

(b) What is the formula of the white gelatinous precipitate obtained?

(c) Give the balanced equation(s) when sulphate of this metal reacts with ammonia solution in excess.

Answer

(a) Zinc (Zn) metal salt solution was used

(b) $Zn(OH)_2$

(c) The balanced equations are given below:

$$ZnSO4 \text{colourless solution} + 2NH_4OH \longrightarrow Zn(OH)2 \downarrow \text{white gelatinous ppt} + (NH4)2SO4 \text{colourless in solution}$$

With excess of NH_4OH ppt. dissolves

$$Zn(OH)_2 + (NH_4)_2SO_4 + 2NH_4OH \longrightarrow [(Zn(NH3)4]SO4 \text{Tetraamminezinc (II) sulphate} + 4H_2O$$