WORKSHEET 1

CHAPTER 4 – ANALYTICAL CHEMISTRY

A. Tick (✓) the correct option.

1. The salt which in solution gives a pale green precipitate with sodium hydroxide solution and a white precipitate with barium chloride solution is

   a. iron(III) sulphate. b. iron(II) sulphate. c. iron(II) chloride. d. iron(III) chloride.

2. What is the colour of precipitate when calcium chloride reacts with sodium hydroxide?

   a. Dirty green b. White c. Yellow d. Black

3. Name the gas evolved when alkalis react with amphoteric metals.

   a. Oxygen b. Ammonia c. Hydrogen d. No gas evolves

4. If a white gelatinous precipitate is formed which dissolves in excess ammonium hydroxide, then the metal cation in the salt solution can be

   a. copper. b. calcium. c. zinc. d. sodium.

5. If a reddish brown precipitate is formed which is insoluble in excess sodium hydroxide, then the metal cation in the salt solution is

   a. iron (II). b. calcium. c. iron(III). d. magnesium.

B. Sodium hydroxide solution is added first in a small quantity, then in excess to the aqueous salt solutions of copper(II) sulphate, zinc nitrate, calcium chloride and iron(III) sulphate. W rite the colour of the precipitate in (i) to (v) and the nature of the precipitate (soluble or insoluble) in (vi) to (x).

Aqueous salt solution	Colour of precipitation when NaOH is added in a small quantity	Nature of precipitation (soluble or insoluble) when NaOH is added in excess
Copper(II) sulphate	(i)	(vi)
Zinc nitrate	(ii)	(vii)
Lead nitrate	(iii)	(viii)
Calcium chloride	(iv)	(ix)
Iron(III) sulphate	(v)	(x)

Name: ..... Teacher's signature: .....

Class: ..... X ..... Date: .....

C. Complete the following reactions.

1. $FeSO_4 + 2NaOH \rightarrow$
2. $FeSO_4 + 2NH_4OH \rightarrow$
3. $Zn(OH)_2 + 4NH_4OH \rightarrow$
4. $ZnO + 2HCl \rightarrow$
5. $Zn(OH)_2 + 2NaOH \rightarrow$

D. Match the following.

	Cation	Colour
1.	Cu^{2+}	colourless
2.	Ti^{3+}	pink
3.	Cr^{3+}	green
4.	Mn^{2+}	purple
5.	Zn^{2+}	ranging from blue to green

E. Answer the following.

1. What is analytical chemistry?
2. Why do compounds have colours?
3. How is the formation of coloured precipitates helpful?
4. What do you observe when ammonium hydroxide is added to iron(III) sulphate solution?
5. How would you distinguish between Zn^{2+} and Pb^{2+} using ammonium hydroxide solution?

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. b 2. b 3. c 4. c 5. c

B.

Aqueous salt solution	Colour of precipitation when NaOH is added in a small quantity	Nature of precipitation (soluble or insoluble) when NaOH is added in excess
Copper(II) sulphate	sky blue precipitate	insoluble
Zinc nitrate	white precipitate	soluble
Lead nitrate	white precipitate	soluble
Calcium chloride	white precipitate	insoluble
Iron(III) sulphate	chocolate brown precipitate	insoluble

C. Complete the following reactions.

1. $FeSO_4 + 2NH_4OH \rightarrow Fe(OH)_2\downarrow + (NH_4)_2SO_4$
2. $FeSO_4 + 2NH_4OH \rightarrow Fe(OH)_2\downarrow + (NH_4)_2SO_4$
3. $Zn(OH)_2 + 2NaOH \rightarrow Na_2ZnO_2 + 2H_2O$
4. $ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$
5. $Zn(OH)_2 + 2NaOH \rightarrow Na_2ZnO_2 + 2H_2O$

D. Match the following.

	Cation	Colour
1.	Cu^{2+}	ranging from blue to green
2.	Ti^{3+}	purple
3.	Cr^{3+}	green
4.	Mn^{2+}	pink
5.	Zn^{2+}	colourless

E. Answer the following.

1. Analytical Chemistry is a branch of chemistry that deals with the qualitative and quantitative analysis of compounds.
2. This is because the ions of these elements have a tendency to absorb light of a particular colour in the visible region and reflect or transmit the rest. The light that is transmitted is the colour of the substance.

3. The formation of coloured precipitate helps in the identification of the metal cation that is present in the salt.

4. Chocolate brown precipitate is obtained.

5.

With NH_4OH	Pb^{2+} gives white precipitate insoluble in excess.	Zn^{2+} gives white precipitate soluble in excess.