Girls' High School & College, Prayagraj

Session: 2020-21

Class: X A, B, C, D, E, F

Subject: Chemistry Practical

Instructions: Students are advised to write the following chemistry practicals (Exp. No. 5 to 8) in chemistry practical file (D. N. publication). These experiments are to be written neatly. The same pattern of writing is to be followed as given. Write each experiment on a fresh page.

EXPERIMENT No. 5

(A)

Prepare the aqueous solution of the given substance, divide it into three parts and perform the following experiments.

(A-1)

To the first part of the solution add NaOH drop by drop and then in excess. Make your observations, name the cation and give your deduction.

(1) **Observation**:
   (i) The original solution is pale green in colour.
   (ii) On adding NaOH drop by drop, a dirty green precipitate is obtained.
   (iii) On adding excess NaOH, dirty green precipitate does not dissolve.

(2) **Name of the cation**: Ferrous ion (Fe^{2+})

(3) **Deduction**:
   (i) Dirty green precipitate is obtained due to the formation of ferrous hydroxide.
   (ii) The given salt is a ferrous salt.

(A-2)

To the second part of the solution, add 4-5 drops of concentrated nitric acid and boil. Add NaOH to it. Make your observations, name the cation and give your deductions.

(1) **Observation**:
   (i) On boiling the original solution with concentrated nitric acid, it turns brownish yellow.
   (ii) On adding NaOH solution, reddish brown precipitate is formed.
   (iii) On adding excess NaOH, the precipitate does not dissolve.

(2) **Name of the cation**: Ferric (Fe^{3+})

(3) **Deduction**: On boiling the solution with concentrated nitric acid, it becomes brownish yellow because ferrous is oxidized to ferric. On adding NaOH solution reddish brown precipitate is obtained due to the formation of ferric hydroxide.

(A-3)

To the third part of the solution, add a few drops of dil. HCl and barium chloride solution. Make your observations, name the anion and give your deduction.

(1) Observation:

(i) On adding barium chloride, a thick white precipitate is obtained which is insoluble in dil. HCl

(2) **Name of the anion**: Sulphate ion (SO_4^{2-})

(3) **Deduction:** The white precipitate is of barium sulphate and the salt provided was of ferrous sulphate.

EXPERIMENT No. 6

(A)

Take a small amount of the given salt in a clean test tube and add dil. HCl. Make your observations, identify the gas evolved, name the anion and give your deduction.

(1) Observations:

(i) On adding dil. HCl to the given salt, a gas is evolved with brisk effervescence.

(ii) The gas is colourless and odourless

(iii) The gas turns blue litmus red, hence it is acidic in nature.

(iv) The gas turns limewater milky but has no effect on acidified $K_2Cr_2O_7$ solution.

(2) **Identification of the gas evolved**: The evolved gas is carbon dioxide.

(3) **Name of the anion**: Carbonate ion (CO_3^{2-})

(4) **Deduction:** The given salt is a carbonate salt.

(B)

To a little portion of the solution obtained on adding dil. HCl to the given salt, add NaOH solution drop by drop and then in excess. Make your observations.

(1) Observations:

(i) On adding NaOH solution drop by drop, a white precipitate is obtained.

(ii) In excess of NaOH, the precipitate does not dissolve.

(C)

To a little portion of the solution obtained in (A) i.e. on adding dil. HCl to the given salt, add NH_4OH solution drop by drop and then in excess. Make your observations, name the cation and give your deduction.

(1) **Observation**:
   (i) On adding NH_4OH, no precipitate is formed.
(2) **Name of the cation**: Calcium ion (Ca^{+2})
(3) **Deduction**:
   (i) On adding NaOH to the salt solution, white precipitate of calcium hydroxide is formed, but there is no precipitate formed on adding NH_4OH solution.
   (ii) The given salt is calcium carbonate.

EXPERIMENT No. 7

(A)

Take a small amount of the substance in a clean dry hard glass test tube and heat it strongly. Record your observations, identify the gas evolved and give your deduction.

(1) Observation:
   (i) Heavy, white crystalline solid, on strong heating, crumbles with a crackling noise.
   (ii) It gives off a reddish brown gas, which turns moist blue litmus paper red.
   (iii) When a glowing wooden splinter is held in the reddish brown gas, it relights showing the presence of oxygen.
   (iv) The residue is reddish brown when hot. On cooling, it changes to yellow, partly fuses in glass, and stains it yellow.
(2) **Identification of the gas evolved**:
   (i) The gas is reddish brown in colour having an irritating odour.
   (ii) It turns moist blue litmus paper red.
   (iii) It turns starch iodide paper from colourless to blue-black.
   (iv) It turns green acidified ferrous sulphate solution brown.

   Thus, the gas evolved is Nitrogen Dioxide (NO_2).

(B)

Take a small amount of the salt in the test tube, add conc. H_2SO_4 and warm gently. Make your observation, name the anion and give your deduction.

(1) Observation:

(i) Reddish brown fumes evolve.

(ii) The fumes become thick on adding copper turnings.

(2) **Identification of the gas evolved**: The gas evolved is nitrogen dioxide.

(3) **Confirmatory test of the anion**: To the aqueous solution of the salt, add freshly prepared ferrous sulphate solution, then cautiously pour a few drops of conc. H_2SO_4 along the side of the test tube. A brown ring appears at the junction of the two liquids. The brown ring disappears on shaking.

(4) **Name of the anion**: Nitrate ion (NO_3^-)

(5) **Deduction**: The given substance is a nitrate salt

(C)

To the salt solution, add NaOH solution drop by drop and then in excess, record your observation and give your deduction

(1) Observation:

(i) On adding NaOH drop by drop a thick white precipitate is obtained

(ii) On adding excess NaOH the white precipitate gets dissolved and a clear solution is obtained.

(2) **Deduction**: The thick white precipitate is of lead hydroxide. It dissolves in excess of NaOH due to the formation of sodium plumbite (Na_2PbO_2).

(D)

To the salt solution, add NH_4OH solution drop by drop and then in excess. Record your observation and give your deduction.

(1) **Observation**:

(i) On adding NH_4OH drop by drop, a white ppt. is obtained which remains insoluble in excess NH_4OH.

(2) **Deduction**:

(i) The white ppt. is of lead hydroxide.

(ii) The given salt is lead nitrate.

EXPERIMENT No. 8

Take the salt in a clean, dry, hard test tube and heat it strongly. Make your observation and give deduction.

(1) **Observation**:

(i) Bluish green crystalline solid, on heating, melts to form a bluish green mass and gives off steamy vapours that condense on the cooler parts of the test tube to form droplets of water.

(ii) On further heating, the bluish green mass changes to a black residue, i.e. copper (II) oxide.

(iii) It gives off a reddish brown gas.

(iv) It also gives a gas that rekindles a glowing splinter, i.e. oxygen.

(2) **Deduction** :

(I) The residue obtained is of copper (II) oxide.

(II) Gases evolved are Water vapour, nitrogen dioxide and oxygen.

(III) The given substance is copper (II) nitrate hexahydrate.

END