| (   | 2018-19 +1 New syllabus) Sy  | ystematic Analysis of Given S           | Simple Salt                    |
|-----|--|---|--------------------------------|
| o ( | <b>Experiment</b>  | Observation Observation                 | Inference                      |
|     | Colour:  | Blue /Green                             | May be Copper salts            |
| •   | Colour of the salt.  | Brown                                   | May be an Iron(ferric) sa      |
|     | Colour of the sait.  | Colourless                              | I                              |
|     |  | Colouriess                              | Absence of Copper a Iron Salts |
|     | Action of heat :   | i)Daddish brown gas                     |                                |
|     |  | i)Reddish brown gas                     | May be Nitrate                 |
| •   | Little of the salt is heated in a dry test tube.   | ii)Pungent smelling gas                 | May be Ammonium                |
|     | test tube.   | giving dense white fumes                | May be Ammonium                |
|     |  | with glass rod dipped in conc. HCl      |                                |
|     |  |   | May be Zine                    |
|     |  | iii)Yellow when hot, white when cooled. | Way be Zinc                    |
|     |  |   | Absence of Nitra               |
|     |  | No characteristic change                | Ammonium and Zinc              |
|     | Flame test :   | i) Brick red flame                      | Presence of Calcium            |
|     |  |   |                                |
|     | Little of the salt is made into a  |   | Presence of Barium             |
|     | paste with conc. HCl in a watch glass and it is burnt by the ion   |   | Presence of copper             |
|     | luminous part of the Bursen flame  | iv)No characteristic flame              | Absence of Copp                |
|     | using a glass rod  |   | Calcium and Barium             |
|     | luminous part of the Bunsen flame using a glass rod.  Action of dil.HCl: Salt + dil.HCl and heated   | i)Colourless, Odourless gus             |                                |
| •   | Salt + dil HCl and heated  | with brisk effervescence                | Presence of Carbon             |
|     | Sait + dif. rici and heated  | turning lime water milky                |                                |
|     | (E)  | ii)Rotten egg smelling                  |                                |
|     | TO THE PARTY OF TH | terning lead acceptance                 | confirmed                      |
|     |  | turning lead acctate paper              | Commined                       |
|     |  | iii)Reddish brown gas with              | Presence of Nitrate            |
|     |  | the fishy odour turning a               | Tresence of Initiate           |
|     |  | moist ferrous sulphate paper            |                                |
|     |  | brown                                   |                                |
|     |  | iv)No characteristic change             | Absence of Nitra               |
|     |  | 1v)rvo characteristic change            | Carbonate & Sulphide           |
|     | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :  | A colourless gas evolves. It            | Caroniae & Surpinde            |
| •   | Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | gives a dense white fumes               | Presence of chloride           |
|     | 541 1 55115. 11 <sub>2</sub> 554 1 1154164.  | when a glass rod dipped in              | 1 10501100 of chilotide        |
|     |  | liquid ammonia is brought               |                                |
|     |  | close to its mouth.                     |                                |
|     |  | A reddish brown gas turning             | Presence of bromide            |
|     |  | . ~ .                                   | 1 resence of bronning          |
|     |  | 1 1                                     |                                |
|     |  | green evolves.                          |                                |

|     | cation!<br>TC CHEMISTRY TUITION CENTR  | Determination!! E, 41/1- PWD ROAD, NAGE  | Distinction!!!  RCOIL, 9940847892   |
|-----|--|--|---|
|     |  | Reddish brown gas turning acidified ferrous sulphate paper green evolves.  | Presence of nitrate   |
|     |  | No characteristic change.  | Absence of Chlorid Bromide & Nitrate  |
| 6.  | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> :<br>Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and | turning starch iodide paper  | Presence of chloride  |
|     | heated.  | A reddish brown gas turning moist fluorescein paper red evolves  | Presence of Bromide   |
|     |  | No characteristic change.  | Absence of Chlorid<br>Bromide   |
| 7.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.   | Reddish brown gas No reddish brown gas   | Presence of Nitrate Absence of Nitrate  |
| 8.  | Action of dil. NaOH:<br>Salt + dil. NaOH and heated  | NAGERCOIL  | salt  Absence of Ammoniu  |
| 9.  | Chromyl chloride test: Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                  | Red orange vapours evolved is passed through NaOH in a tear tube. Yellow solution is obtained. On adding dil acetic acid and Lead acetate solution, yellow precipitate is formed.  No red orange vapours |   |
|     | Prepara  | evolved tion of Sodium Carbonate ex  |   |
| cal | Salt $+Na_2CO_3 +$ distille led sodium carbonate extract.  | ed water, Boiled, Cooled and   | filtered. The clear filtrate  |
| 10  | <b>Test for halides:</b> Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>   | i)Curdy white precipitate ii)A pale yellow ppt iii)Black precipitate iv)No characteristic precipitate  | Presence of Chloride Presence of Bromide Presence of Sulphide Absence of Chlorid Bromide and Sulphide |

|                           | TC CHEMISTRY TUITION CENTRE,  | TI/I-I WD ROAD, NACL   |  |
|---------------------------|---|--|--|
| 11                        | BaCl <sub>2</sub> test:<br>Extract + dil. HCl +BaCl <sub>2</sub>  | White precipitate insoluble in dil H <sub>2</sub> SO <sub>4</sub>  |  |
|                           |   | No white precipitate   | Absence of Sulphate  |
| 12                        | Lead acetate test:<br>Extract + CH <sub>3</sub> COOH +Lead acetate  | White precipitate soluble in ammonium acetate.   | Presence of Sulphate   |
|                           |   | No White precipitate   | Absence of Sulphate  |
| 13                        | <b>Brown Ring test:</b> Extract +   | Brown ring is formed   | Presence of Nitrate  |
|                           | dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> and conc. H <sub>2</sub> SO <sub>4</sub> is added along the sides of the test tube.   |  | Absence of Nitrate   |
| 14                        | Ammonium molybdate test:<br>Extract + dil HNO <sub>3</sub> + ammonium   | A canary yellow ppt is formed.   | Presence of phosphate  |
|                           | molybdate and Conc. HNO <sub>3</sub>  | No yellow precipitate  | Absence of phosphate   |
| 15                        | <b>Test with sodium nitro bruside:</b> Extract + dil .ammonia + sodium  | A purple or violet colouration appears   | Presence of sulphide.  |
|                           | nitro bruside.  | No purple or violet colouration  | Absence of suphide   |
|                           | eparation of Original Solution:<br>alt + water (dil. HNO <sub>3</sub> or dil. HCl) gives<br>Analysis Of Ammonium:   | Chocolate brown  | Presence of Ammoniu  |
| S                         | eparation of Original Solution:<br>alt + water (dil. HNO3 or dil HC1) gives   | original olution. (Cuco Mge brown precipitate  | O3 CaCO3, ZnS salt used dil. HNO3 or dilHO 4 Presence of Ammoniu (Group0)  Absence of Ammonium   |
| <u>S</u><br>1.            | eparation of Original Solution: alt + water (dil. HNO <sub>3</sub> or dil. I(1) gives  Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent   | original olution. (Cuco Mg. brown precipitate brown precipitate  | Presence of Ammoniu<br>(Group0)  |
| S<br>1.                   | eparation of Original Solution: alt + water (dil. HNO <sub>3</sub> or dil HCl) gives Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  oup Separation   | original olution. (Cuco Mg. brown precipitate brown precipitate  | Presence of Ammonium Absence of Ammonium Presence of I group Lead  |
| S<br>1.<br>G1<br>1.       | eparation of Original Solution: alt + water (dil. HNO3 or dil. HC1) gives  Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  Oup Separation Original Solution + dil. HC1  Original Solution + dil. HC1+ H2S gas   | original solution. (Cuco Mgc Chocolate brown precipitate brown precipitate brown precipitate   | Presence of Ammonium  Absence of Ammonium  Presence of I group Lead Absence of I group Lead Presence of II group Lead  |
| S<br>1.<br>G1<br>1.       | eparation of Original Solution: alt + water (dil. HNO <sub>3</sub> or dil. ICI) gives  Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  oup Separation Original Solution + dil. HCl  | original olution. (Cuco Mgc Chocolate brown precipitate brown precipitate brown precipitate white precipitate  | Presence of Ammonium  Absence of Ammonium  Presence of I group Lead  Absence of I group Lead  Presence of II group Lead  Copper  Absence of II group Lead  Absence of II group Lead  Presence of II group Lead  Presence of II group Lead  Presence of II group Lead   |
| S<br>1.<br>G1<br>1.       | eparation of Original Solution: alt + water (dil. HNO3 or dil. HC1) gives  Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  Oup Separation Original Solution + dil. HC1  Original Solution + dil. HC1+ H2S gas   | original solution. (Cuco Me brown precipitate brown precipitate brown precipitate brown precipitate Black precipitate  | Presence of Ammonium  Absence of I group Lead Absence of I group Lead Presence of II group Lead Presence of II group Copper Absence of II group Copper Presence of III group Copper  |
| S<br>1.<br>G1<br>1.       | eparation of Original Solution: alt + water (dil. HNO3 or dil. HCl) gives  Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  oup Separation Original Solution + dil. HCl  Original Solution + dil. HCl+ H2S gas is passed   | original solution. (Cuco Mge brown precipitate brown precipitate brown precipitate brown precipitate Black precipitate  No Black precipitate  No Black precipitate   | Presence of Ammonium  Absence of I group Lead Absence of I group Lead Presence of II group Copper Absence of II group Copper Copper  |
| S<br>1.<br>GI<br>1.<br>2. | eparation of Original Solution: alt + water (dil. HNO3 or dil. HCl) gives  Analysis Of Ammonium: Original Solution + NAOH + Nessler's reagent  Oup Separation Original Solution + dil. HCl  Original Solution + dil. HCl+ H2S gas is passed  Original Solution + NH4Cl + NH4OH                                    | original solution. (Cuco Mge brown precipitate b | Presence of Ammonium  Absence of I group Lead Absence of I group Lead Presence of II group Lead Presence of II group Copper Absence of II group Copper Presence of III group Aluminium or Ferric iron Absence of III group A   |
| S<br>1.<br>G1<br>1.<br>2. | eparation of Original Solution: alt + water (dil. HNO3 or dil. HCl) gives  Analysis Of Ammonium: Original Solution + NAOH + Nessler's reagent  Oup Separation Original Solution + dil. HCl  Original Solution + dil. HCl+ H2S gas is passed  Original Solution + NH4Cl + NH4OH  Original Solution + NH4Cl + NH4OH | original solution. (Cuco Mac Checolate brown precipitate brown precipitate brown precipitate  White precipitate  No Black precipitate  White precipitate  No Black precipitate  Dirty white precipitate  | Presence of Ammonium  Absence of I group Lead Absence of I group Lead Absence of II group Lead Presence of II group Copper Absence of III group Copper Presence of III group Aluminium or Ferric iro Absence of III group A  |
| <u>S</u><br>1.            | eparation of Original Solution: alt + water (dil. HNO3 or dil. HCl) gives  Analysis Of Ammonium: Original Solution + NAOH + Nessler's reagent  Oup Separation Original Solution + dil. HCl  Original Solution + dil. HCl+ H2S gas is passed  Original Solution + NH4Cl + NH4OH                                    | original solution. Cuco Mge Chocolate brown precipitate  No chocolate brown precipitate  White precipitate  Black precipitate  No Black precipitate  White precipitate  Dirty white precipitate  No dirty white precipitate  No dirty white precipitate  | Presence of Ammonium  Absence of I group Lead Absence of I group Lead Presence of II group Lead Presence of II group Copper Absence of II group Copper Presence of III group Aluminium or Ferric iround Absence of III group Absence of III grou |

|    |  | Determination!!          | Distinction!!!                    |
|----|--|--------------------------|-----------------------------------|
| AC | TC CHEMISTRY TUITION CENTRE,   |                          |                                   |
| 6. | Original solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH + disodium hydrogen phosphate            | White precipitate        | Presence of VI group<br>Magnesium |
|    |  | No White precipitate     | Absence of VI group<br>Magnesium  |
|    | Confirmatory Test For  | Basic Radicals           | 100                               |
| 1. | Lead (Group I)   |                          |                                   |
|    | Original solution + KI solution  | Yellow precipitate       | Lead is confirmed                 |
| 2. | Copper (Group II) Original solution<br>+ Acetic acid + potassium<br>ferrocyanide                     | Red brown precipitate    | e Copper is confirmed             |
| 3  | Aluminium (Group III) Original solution + sodium peroxide + dil HCl                                  | Gelatinous white ppt     | Aluminium is confirmed            |
|    | Ferric Iron (Group III) Original solution + sodium peroxide + dil HCl + potassium ferrocyanide       | Blue precipitate         | Ferric iron is confirmed          |
| 4. | Zinc (Group IV) Original solution + potassium ferro cyanide  | White precipitate        | Zinc is confirmed                 |
| 5. | Barium (Group V) Original solution + polassium chromate  | Yellow precipitate       | Barium is confirmed               |
| 6. | Calcium (Group V) Original solution+NH <sub>4</sub> OH +Ammonium oxalate                             | White precipitate        | alcium is confirmed               |
| 7  | Magnesium (Group VI) Original solution + NaOH + Magneson reagent                                     | Blue precipitate         | Magnesium is confirmed            |
| 8  | Ammonium (Zero group) Original solution + NaOH + Nessler's reagent  Result: The given simple salt of | Chocolate be precipitate | rown Ammonium is confirmed        |

**Result:** The given simple salt contains

Acid radical \_\_\_\_\_ Basic radical \_\_\_\_\_ The given simple salt is \_\_\_\_\_

#### List of salts

- 1. Lead Nitrate
- 2. Copper Sulphate
- 3. Copper Carbonate
- 4. Ferric Chloride
- 5. Zinc Sulphate
- 6. Zinc Sulphide
- 7. Aluminium Sulphate

NEW SYLLABUS 2018-19.

- 8. Aluminium Nitrate
- 9. Calcium Carbonate
- 10. Barium Chloride
- 11. Ammonium Chloride
- 12. Ammonium Bromide
- 13. Magnesium Sulphate
- 14. Magnesium Carbonate
- 15. Magnesium Phosphate

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Determination!!

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 1. LEAD NITRATE  |   |  |  |
|----|--|---|--|--|
| NO | Experiment   | Observation   | Inference                                |  |
| 1. | Colour of the salt   | Colourless  | Absence of Copper and Iron Salts         |  |
| 2. | Action of heat: Little of the salt is heated in a dry  | Reddish brown gas   | May be Nitrate                           |  |
|    | test tube  |   |  |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame   | Absence of Copper,<br>Calcium and Barium |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | Reddish brown gas with the fishy odour turning a moist ferrous sulphate paper brown | Presence of Nitrate                      |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | Reddish brown gas turning acidified ferrous sulphate paper green evolves.           | Presence of nitrate                      |  |
| 6. | Action of MnO <sub>2</sub> and Conc. H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.                   | No characteristic change.   | Absence of Chloride,<br>Bromide          |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | Reddish brown gas   | Presence of Nitrate                      |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonium salt                 |  |
| 9. | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved   | Absence of Chloride                      |  |

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

#### **Preparation of Sodium Carbonate extract:**

Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract.

| 10 | Test for halides:   | No characteristic    | Absence of Chloride, |
|----|---|----------------------|----------------------|
|    | Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>                     | precipitate          | Bromide and Sulphide |
| 11 | <b>BaCl<sub>2</sub> test:</b> Extract + dil. HCl +BaCl <sub>2</sub>     | No white precipitate | Absence of Sulphate  |
| 12 | Lead acetate test:  | No White precipitate | Absence of Sulphate  |
|    | Extract + CH <sub>3</sub> COOH +Lead acetate                            |                      |                      |
| 13 | <b>Brown Ring test:</b> Extract +                                       | Brown ring is formed | Presence of Nitrate  |
|    | dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> |                      |                      |
|    | and conc. $H_2SO_4$ is added along the                                  |                      |                      |
|    | sides of the test tube.   |                      |                      |
| 14 | Ammonium molybdate test:  | No canary yellow     | Absence of phosphate |
|    | Extract + dil HNO <sub>3</sub> + ammonium                               | precipitate          |                      |
|    | molybdate and Conc. HNO <sub>3</sub>                                    |                      |                      |
| 15 | Test with sodium nitro bruside:   | No purple or violet  | Absence of sulphide. |
|    | Extract + dil .ammonia + sodium   | colouration appears  |                      |
|    | nitro bruside.  | 5                    | 0 5 5                |

# Analysis of Basic Radicals Solution:

## Preparation of Original Solution:

Salt + water gives original solution.

| III L |                         | 0 0                                 |                         |       |                          |
|-------|-------------------------|-------------------------------------|-------------------------|-------|--------------------------|
|       | 1.                      | Analysis Of Ammonium: Original      | No Chocolate            | brown | Absence of Ammonium      |
|       |                         | Solution + NaOH + Nessler's reagent | precipitate             |       | (Group zero)             |
|       |                         |                                     | <b>Group Separation</b> |       |                          |
|       | 1.                      | Original Solution + dil. HCl        | White precipitate       |       | Presence of I group Lead |
|       | Confirmatory Test -LEAD |                                     |                         |       |                          |
|       | 1.                      | Lead (Group I)                      |                         |       |                          |
|       |                         | Original solution + KI solution     | Yellow precipitate      |       | Lead is confirmed        |

**Result:** The given simple salt contains

- i) Acid radical **Nitrate**
- ii) Basic radical Lead
  - iii) The given simple salt is **Lead nitrate**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 2. COPPER SULPHATE   |                           |                      |  |
|----|--|---------------------------|----------------------|--|
| NO | Experiment   | Observation               | Inference            |  |
| 1. | Colour of the salt   | Blue                      | May be Copper salt   |  |
|    | Action of heat :   | No characteristic change  | Absence of Nitrate,  |  |
| 2. | Little of the salt is heated in a dry                                  |                           | Ammonium and Zinc    |  |
|    | test tube  |                           |                      |  |
|    | Flame test:  | Bluish green flame        | Presence of copper   |  |
| 3. | Little of the salt is made into a                                      |                           |                      |  |
|    | paste with conc. HCl in a watch  |                           |                      |  |
|    | glass and it is burnt by the non luminous part of the Bunsen flame     |                           |                      |  |
|    | using a glass rod  |                           |                      |  |
| 4. | Action of dil.HCl:   | No characteristic change  | Absence of Nitrate,  |  |
|    | Salt + dil.HCl and heated.   | The characteristic change | Carbonate & Sulphide |  |
|    |  |                           |                      |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :                        | No characteristic change. | Absence of Chloride, |  |
|    | Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.                    |                           | Bromide & Nitrate    |  |
| 6. | Action of MnO <sub>2</sub> and Conc.                                   | No characteristic change. | Absence of Chloride, |  |
|    | H <sub>2</sub> SO <sub>4</sub> ;                                       |                           | Bromide              |  |
|    | Salt + $MnO_2$ + Conc. $H_2SO_4$ and                                   | 95990 99299               |                      |  |
|    | heated.  |                           |                      |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper                   | No Reddish brown gas      | Absence of Nitrate   |  |
|    | turning test:  |                           |                      |  |
|    | Salt + Copper turnings + conc.   |                           |                      |  |
| 8. | H <sub>2</sub> SO <sub>4</sub> and heated. <b>Action of dil. NaOH:</b> | No Pungent smelling gas   | Absence of Ammonium  |  |
| ο. | Salt + dil. NaOH and heated  | 110 I ungent smening gas  | salt                 |  |
|    |  | NI 1                      |                      |  |
| 9. | Chromyl chloride test:   | No red orange vapours     | Absence of Chloride  |  |
|    | Salt + $K_2Cr_2O_7$ + Conc. $H_2SO_4$ and heated.                      | evolved                   |                      |  |
|    | neacu.   |                           | <u> </u>             |  |

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Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. 10 | Test for halides: No characteristic Absence of Chloride, Extract + dil. HNO<sub>3</sub> + AgNO<sub>3</sub> precipitate Bromide and Sulphide **BaCl<sub>2</sub> test:**Extract + dil. HCl +BaCl<sub>2</sub> Presence of Sulphate 11 White precipitate insoluble in dil.H<sub>2</sub>SO<sub>4</sub> White precipitate soluble Presence of Sulphate 12 | Lead acetate test: in ammonium acetate. Extract + CH<sub>3</sub>COOH +Lead acetate 13 Absence of Nitrate **Brown Ring test:** No Brown ring is formed Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** 14 No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> purple 15 **Test with sodium nitro bruside:** No violet Absence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. 1. Analysis Of Ammonium: Original No chocolate Absence of Ammonium brown Solution + NaOH + Nessler's reagent precipitate (Group zero) **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas Black precipitate Presence of II group 2. is passed Copper **Confirmatory Test - Copper** Copper (Group II) Original solution | Red brown precipitate Copper is confirmed acid + Acetic potassium ferrocyanide

**Result:** The given simple salt contains

- i) Acid radical **Sulphate**
- ii) Basic radical Copper
  - iii) The given simple salt is **Copper sulphate**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|     | 3. COPPER CARBONATE  |  |                                 |  |
|-----|--|--|---------------------------------|--|
| NO  | Experiment   | Observation  | Inference                       |  |
| 1.  | Colour of the salt   | Green  | May be Copper salt              |  |
|     | Action of heat :   | No characteristic change                           | Absence of Nitrate,             |  |
| 2.  | Little of the salt is heated in a dry                        |  | Ammonium and Zinc               |  |
|     | test tube  |  |                                 |  |
|     | Flame test:  | Bluish green flame                                 | Presence of copper              |  |
| 3.  | Little of the salt is made into a                            |  |                                 |  |
|     | paste with conc. HCl in a watch                              |  |                                 |  |
|     | glass and it is burnt by the non                             |  |                                 |  |
|     | luminous part of the Bunsen flame                            |  |                                 |  |
| 4   | using a glass rod  | Calardas Androdas As                               |                                 |  |
| 4.  | Action of dil.HCl: Salt + dil.HCl and heated.                | Colourless, Odourless gas with brisk effervescence | Dragonas of Corbonata           |  |
|     | Sait + dif. HCl and fleated.                                 | turning lime water milky                           | Presence of Carbonate confirmed |  |
| 5.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :              | No characteristic change.                          | Absence of Chloride,            |  |
| ٦.  | Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.          | Two characteristic change.                         | Bromide & Nitrate               |  |
| -   |  | No abarratariatio abarra                           |                                 |  |
| 6.  |  | No characteristic change.                          | Absence of Chloride,<br>Bromide |  |
|     | $H_2SO_4$ ;<br>Salt + MnO <sub>2</sub> + Conc. $H_2SO_4$ and | VICIDUILCI.  | Bronnide                        |  |
|     | heated. $11_230_4$ and                                       |  |                                 |  |
| 7.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper         | No Reddish brown gas                               | Absence of Nitrate              |  |
| ' ' | turning test:  | Tro Trouble of Swift guis                          |                                 |  |
|     | Salt + Copper turnings + conc.                               | 1  |                                 |  |
|     | H <sub>2</sub> SO <sub>4</sub> and heated.                   |  |                                 |  |
| 8.  | Action of dil. NaOH:   | No Pungent smelling gas                            | Absence of Ammonium             |  |
|     | Salt + dil. NaOH and heated                                  |  | salt                            |  |
| 9.  | Chromyl chloride test:                                       | No red orange vapours                              | Absence of Chloride             |  |
|     | Salt + $K_2Cr_2O_7$ + Conc. $H_2SO_4$ and                    | evolved  |                                 |  |
|     | heated.  |  |                                 |  |
|     |  |  |                                 |  |

E.MUTHUSAMY M.Sc.(che), MSc(psv)., M.Ed., MPhil., M.A.(Eng), MA(Soc)., MA(P.admin)., DMLT., BLISc., PGDCA.

Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. 10 | Test for halides: No characteristic Absence of Chloride, Extract + dil.  $HNO_3 + AgNO_3$ precipitate Bromide and Sulphide **BaCl<sub>2</sub> test:**Extract + dil. HCl +BaCl<sub>2</sub> precipitate | Presence of Sulphate 11 White insoluble in dil.H<sub>2</sub>SO<sub>4</sub> White precipitate soluble Presence of Sulphate 12 | Lead acetate test: in ammonium acetate. Extract + CH<sub>3</sub>COOH +Lead acetate 13 Absence of Nitrate **Brown Ring test:** No Brown ring is formed Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** 14 No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> purple 15 **Test with sodium nitro bruside:** No violet Absence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + dil/HNO<sub>3</sub> gives original solution. 1. Analysis Of Ammonium: No chocolate Absence of Ammonium brown Solution + NaOH precipitate (Group zero) Original Nessler's reagent **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas Black precipitate Presence of II group 2. is passed Copper **Confirmatory Test - Copper** Red brown precipitate Copper (Group II) Original solution Copper is confirmed acid Acetic + potassium ferrocyanide

The given simple salt contains **Result:** 

- Acid radical Carbonate i)
- Basic radical Copper ii)
  - iii) The given simple salt is **Copper carbonate**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 4. FERRIC CHLORIDE   |   |   |  |  |
|----|--|---|---|--|--|
| NO | Experiment   | Observation   | Inference                                   |  |  |
| 1. | Colour of the salt   | Brown   | May be an Iron(Ferric) salt                 |  |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change  | Absence of Nitrate,<br>Ammonium and Zinc    |  |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame   | Absence of Copper, Calcium and Barium       |  |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | No characteristic change  | Absence of Nitrate,<br>Carbonate & Sulphide |  |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth.   | Presence of chloride                        |  |  |
| 6. | Action of $MnO_2$ and $Conc.$ $H_2SO_4$ : Salt + $MnO_2$ + $Conc.$ $H_2SO_4$ and heated.   | A greenish yellow gas turning starch iodide paper blue evolves.   | Presence of chloride                        |  |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas  | Absence of Nitrate                          |  |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonium salt                    |  |  |
| 9. | Chromyl chloride test: Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                      | Red orange vapours evolved is passed through NaOH in a test tube. Yellow solution is obtained. On adding dil acetic acid and Lead acetate solution, yellow precipitate is formed. | Presence of Chloride confirmed              |  |  |

www.Padasalai.Net www.TrbTnpsc.com Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. Curdy white precipitate 10 Test for halides: Presence of Chloride Extract + dil.  $HNO_3 + AgNO_3$ BaCl<sub>2</sub> test: Extract + dil. HCl +BaCl<sub>2</sub> No White precipitate Absence of Sulphate 12 Lead acetate test: No White precipitate Absence of Sulphate Extract + CH<sub>3</sub>COOH +Lead acetate Absence of Nitrate 13 **Brown Ring test:** Extract + No Brown ring is formed dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. 14 **Ammonium molybdate test:** No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 Test with sodium nitro bruside: No purple violet Absence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. 1. Analysis Of Ammonium: No chocolate Absence of Ammonium brown + NaOH Solution precipitate Original (Group zero) Nessler's reagent **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of II group 2. is passed Copper Presence of III group Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH White precipitate 3. Aluminium Ferric or iron. **Confirmatory Test – Ferric** Ferric Iron (Group III) Original Blue precipitate

solution + sodium peroxide + dil HCl + potassium ferro cyanide

Ferric iron is confirmed

The given simple salt contains **Result:** 

- Acid radical **Chloride** i)
- Basic radical Ferric ii)
  - iii) The given simple salt is **Ferric chloride**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 5. ZINC SULPHATE   |                                     |   |  |
|----|--|-------------------------------------|---|--|
| NO | Experiment   | Observation                         | Inference                                   |  |
| 1. | Colour of the salt   | Colourless                          | Absence of Copper and Iron Salts            |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | Yellow when hot, white when cooled. | May be Zinc                                 |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame             | Absence of Copper,<br>Calcium and Barium    |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | No characteristic change            | Absence of Nitrate,<br>Carbonate & Sulphide |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :<br>Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.   | No characteristic change.           | Absence of Chloride, Bromide & Nitrate      |  |
| 6. | Action of $MnO_2$ and $Conc.$ $H_2SO_4$ : Salt + $MnO_2$ + Conc. $H_2SO_4$ and heated.   | No characteristic change.           | Absence of Chloride,<br>Bromide             |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas                | Absence of Nitrate                          |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas             | Absence of Ammonium salt                    |  |
| 9. | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved       | Absence of Chloride                         |  |

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Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. 10 | Test for halides: No characteristic Absence of Chloride, Extract + dil.  $HNO_3 + AgNO_3$ precipitate Bromide and Sulphide 11 | **BaCl<sub>2</sub> test:**Extract + dil. HCl +BaCl<sub>2</sub> White precipitate | Presence of Sulphate insoluble in dil.H<sub>2</sub>SO<sub>4</sub> White precipitate soluble Presence of Sulphate 12 | Lead acetate test: in ammonium acetate. Extract + CH<sub>3</sub>COOH +Lead acetate 13 Absence of Nitrate **Brown Ring test:** No Brown ring is formed Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. 14 **Ammonium molybdate test:** No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> purple 15 Test with sodium nitro bruside: No violet Absence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. 1. Analysis Of Ammonium: No chocolate Absence of Ammonium brown Solution precipitate Original + NaOH (Group zero) Nessler's reagent **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of II group 2. is passed Copper Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate Absence of III 3. group Aluminium Ferric or iron. Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH | Dirty white precipitate Presence of IV group 4. + H<sub>2</sub>S gas is passed Zinc **Confirmatory Test - Zinc Zinc** (**Group IV**) Original solution + White precipitate Zinc is confirmed potassium ferro cyanide

**Result:** The given simple salt contains

- i) Acid radical **Sulphate**
- ii) Basic radical Zinc
  - iii) The given simple salt is **Zinc sulphate**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 5. ZINC SULPHIDE   |   |  |  |
|----|--|---|--|--|
| NO | Experiment   | Observation   | Inference                              |  |
| 1. | Colour of the salt   | Colourless  | Absence of Copper and Iron Salts       |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | Yellow when hot, white when cooled.                       | May be Zinc                            |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame                                   | Absence of Copper, Calcium and Barium  |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | Rotten egg smelling gas turning lead acetate paper black. | Presence of Sulphide confirmed         |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :<br>Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.   | No characteristic change.                                 | Absence of Chloride, Bromide & Nitrate |  |
| 6. | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> :<br>Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.             | No characteristic change.                                 | Absence of Chloride,<br>Bromide        |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas                                      | Absence of Nitrate                     |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas                                   | Absence of Ammonium salt               |  |
| 9. | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved                             | Absence of Chloride                    |  |

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Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. Black precipitate Presence of Sulphide 10 Test for halides: Extract + dil.  $HNO_3 + AgNO_3$ Absence of Sulphate **BaCl<sub>2</sub> test:**Extract + dil. HCl +BaCl<sub>2</sub> No white precipitate No White precipitate Absence of Sulphate 12 Lead acetate test: Extract + CH<sub>3</sub>COOH +Lead acetate Absence of Nitrate **Brown Ring test:** No Brown ring is formed Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. 14 **Ammonium molybdate test:** No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 **Test with sodium nitro bruside:** purple violet presence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + dil HNO<sub>3</sub> gives original solution. Analysis Of Ammonium: No chocolate brown Absence of Ammonium Original precipitate (Group zero) Solution **NaOH** Nessler's reagent **Group Separation** Original Solution + dil. HCl No White precipitate Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of II group is passed Copper Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate 3. Absence of III group Aluminium Ferric or iron. Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH | Dirty white precipitate Presence of IV group 4. + H<sub>2</sub>S gas is passed Zinc **Confirmatory Test - Zinc Zinc** (**Group IV**) Original solution + White precipitate Zinc is confirmed potassium ferro cyanide

**Result:** The given simple salt contains

- i) Acid radical **Sulphide**
- ii) Basic radical Zinc
  - iii) The given simple salt is **Zinc sulphide**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 7. ALUMINIUM SULPHATE  |                               |   |  |
|----|--|-------------------------------|---|--|
| NO | Experiment   | Observation                   | Inference                                   |  |
| 1. | Colour of the salt   | Colourless                    | Absence of Copper and Iron Salts            |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change      | Absence of Nitrate,<br>Ammonium and Zinc    |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame       | Absence of Copper,<br>Calcium and Barium    |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | No characteristic change      | Absence of Nitrate,<br>Carbonate & Sulphide |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :<br>Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.   | No characteristic change.     | Absence of Chloride,<br>Bromide & Nitrate   |  |
| 6. | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> :<br>Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.             | No characteristic change.     | Absence of Chloride,<br>Bromide             |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas          | Absence of Nitrate                          |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas       | Absence of Ammonium salt                    |  |
| 9. | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved | Absence of Chloride                         |  |

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

#### **Preparation of Sodium Carbonate extract:**

Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract.

| 10 | Test for halides:   | No characteristic Absence of Chloride,          |
|----|---|---|
|    | Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>                     | precipitate Bromide and Sulphide                |
| 11 | <b>BaCl<sub>2</sub> test:</b> Extract + dil. HCl +BaCl <sub>2</sub>     | White precipitate Presence of Sulphate          |
|    |   | insoluble in dil.H <sub>2</sub> SO <sub>4</sub> |
| 12 | Lead acetate test:  | White precipitate soluble Presence of Sulphate  |
|    | Extract + CH <sub>3</sub> COOH +Lead acetate                            | in ammonium acetate.                            |
| 13 | <b>Brown Ring test:</b> Extract +                                       | No Brown ring is formed   Absence of Nitrate    |
|    | dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> |   |
|    | and conc. H <sub>2</sub> SO <sub>4</sub> is added along the             |   |
|    | sides of the test tube.   |   |
| 14 | Ammonium molybdate test:  | No canary yellow Absence of phosphate           |
|    | Extract + dil HNO <sub>3</sub> + ammonium                               | precipitate                                     |
|    | molybdate and Conc. HNO <sub>3</sub>                                    |   |
| 15 | Test with sodium nitro bruside:   | No purple or violet Absence of sulphide.        |
|    | Extract + dil .ammonia + sodium   | colouration appears                             |
|    | nitro bruside.  |   |

## Analysis of Basic Radicals

### Preparation of Original Solution:

Salt + water gives original solution.

| 1. | Analysis Of Ammonium:                                       | No chocolate brown   | Absence of Ammonium     |
|----|---|----------------------|-------------------------|
|    | Original Solution + NaOH +                                  | precipitate          | (Group zero)            |
|    | Nessler's reagent   |                      |                         |
|    |   | Group Separation     |                         |
| 1. | Original Solution + dil. HCl                                | No White precipitate | Absence of I group Lead |
| 2. | Original Solution + dil. HCl+ H <sub>2</sub> S gas          | No Black precipitate | Absence of II group     |
|    | is passed   |                      | Copper                  |
| 3. | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH | White precipitate    | Presence of III group   |
|    |   |                      | Aluminium or Ferric     |
|    |   |                      | iron.                   |
|    | Confirmatory Test - Al                                      | uminium              |                         |

| Aluminium (Group III) (        | Original |                      |                        |
|--------------------------------|----------|----------------------|------------------------|
| solution + sodium peroxide + o | lil HCl  | Gelatinous white ppt | Aluminium is confirmed |

The given simple salt contains **Result:** 

- Acid radical **Sulphate** i)
- Basic radical Aluminium ii)
  - The given simple salt is Aluminium sulphate iii)

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 8. ALUMINIUM NITRATE   |   |  |  |
|----|--|---|--|--|
| NO | Experiment   | Observation   | Inference                                |  |
| 1. | Colour of the salt   | Colourless  | Absence of Copper and Iron Salts         |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | Reddish brown gas   | May be Nitrate                           |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame   | Absence of Copper,<br>Calcium and Barium |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | Reddish brown gas with the fishy odour turning a moist ferrous sulphate paper brown | Presence of Nitrate                      |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | Reddish brown gas turning acidified ferrous sulphate paper green evolves.           | Presence of nitrate                      |  |
| 6. | Action of MnO <sub>2</sub> and Conc. H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.                   | No characteristic change.   | Absence of Chloride,<br>Bromide          |  |
| 7. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | Reddish brown gas   | Presence of Nitrate                      |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonium salt                 |  |
| 9. | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved   | Absence of Chloride                      |  |

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Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. 10 | Test for halides: No characteristic Absence of Chloride, Extract + dil.  $HNO_3 + AgNO_3$ Bromide and Sulphide precipitate **BaCl<sub>2</sub> test:**Extract + dil. HCl +BaCl<sub>2</sub> No white precipitate Absence of Sulphate No White precipitate Absence of Sulphate 12 Lead acetate test: Extract + CH<sub>3</sub>COOH +Lead acetate **Brown Ring test:** Brown ring is formed Presence of Nitrate Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 **Test with sodium nitro bruside:** No purple violet Absence of sulphide. or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. Analysis Of Ammonium: chocolate No brown Absence of Ammonium Original precipitate (Group zero) Solution NaOH Nessler's reagent **Group Separation** Original Solution + dil. HCl No White precipitate Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of II group Copper is passed Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH White precipitate Presence of III 3. group Aluminium Ferric or iron **Confirmatory Test - Aluminium** Aluminium (Group III) Original Gelatinous Aluminium is confirmed white solution + sodium peroxide + dil HCl precipiate

The given simple salt contains **Result:** 

- Acid radical Nitrate i)
- Basic radical Aluminium ii)
  - The given simple salt is **Aluminium nitrate** iii)

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|     | 9. CAL   | CIUM CARBONATE  |  |
|-----|--|---|--|
| NO  | Experiment   | Observation   | Inference                                |
| 1.  | Colour of the salt   | Colourless  | Absence of Copper and Iron Salts         |
| 2.  | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change  | Absence of Nitrate<br>Ammonium and Zinc  |
| 3.  | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | Brick red flame   | Presence of Calcium                      |
| 4.  | Action of dil.HCl: Salt + dil.HCl and heated.  | Colourless, Odourless gas with brisk effervescence turning lime water milky | Presence of Carbonate confirmed          |
| 5.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | No characteristic change.   | Absence of Chloride Bromide & Nitrate    |
| 6.  | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc.<br>H <sub>2</sub> SO <sub>4</sub> and heated.             | No characteristic change.   | Absence of Chloride,<br>Bromide          |
| 7.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas  | Absence of Nitrate                       |
| 8.  | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonium salt                 |
| 9.  | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved   |  |
| sod | Salt +Na <sub>2</sub> CO <sub>3</sub> + distilled water, B lium carbonate extract.   | of Sodium Carbonate extraction oiled, Cooled and filtered. T                |  |
| 10  | Test for halides: Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>  | No characteristic precipitate   | Absence of Chloride Bromide and Sulphide |
| 11  | BaCl <sub>2</sub> test:Extract + dil. HCl +BaCl  | <del></del>   | <del></del>                              |
| 12  | <b>Lead acetate test:</b> Extract + CH <sub>3</sub> COOH +Lead acetate   | White precipitate soluble in ammonium acetate.                              | Presence of Sulphate                     |

| Dedi | cation!  | Determination!!              | Distinction!!!                                 |
|------|--|------------------------------|--|
| AC   | TC CHEMISTRY TUITION CENTRE,   | 41/1- PWD ROAD, NAGE         | RCOIL, 9940847892                              |
| 13   | Brown Ring test: Extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> and conc. H <sub>2</sub> SO <sub>4</sub> is added along the sides of the test tube. | No Brown ring is formed      | Absence of Nitrate                             |
| 14   | Ammonium molybdate test:<br>Extract + dil HNO <sub>3</sub> + ammonium<br>molybdate and Conc. HNO <sub>3</sub>  | No canary yellow precipitate | Absence of phosphate                           |
| 15   | <b>Test with sodium nitro bruside:</b> Extract + dil .ammonia + sodium nitro bruside.  | colouration appears          | Absence of sulphide.                           |
|      | Analysis of Basi   | c Radicals                   |  |
|      | eparation of Original Solution:<br>alt + dil. HNO <sub>3</sub> gives original solution.  |                              |  |
| 1.   | Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent   | precipitate                  | Absence of Ammonium (Group zero)               |
|      |  | Group Separation             |  |
| 1.   | Original Solution + dil. HCl   | No White precipitate         | Absence of I group Lead                        |
| 2.   | Original Solution + dil. HCl+ H <sub>2</sub> S gas is passed   | No Black precipitate         | Absence of II group Copper                     |
| 3.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH  | No White precipitate         | Absence of III group Aluminium or Ferric iron. |
| 4.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH<br>+ H <sub>2</sub> S gas is passed  | No Dirty white precipitate   | Absence of IV group Zinc                       |
| 5    | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH<br>+ (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>   |                              | Presence of V group Ba or Ca                   |
|      | Confirmatory Test - Ca   | alcium                       |  |
|      | Calcium (Group V) Original solution + NH <sub>4</sub> OH +Ammonium oxalate   |                              | Calcium is confirmed                           |

**Result:** The given simple salt contains

- i) Acid radical **Carbonate**
- ii) Basic radical Calcium
  - iii) The given simple salt is **Calcium carbonate**

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#### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

|    | 10. BARIUM CHLORIDE  |   |   |  |  |
|----|--|---|---|--|--|
| NO | Experiment   | Observation   | Inference                                   |  |  |
| 1. | Colour of the salt   | Colourless  | Absence of Copper and Iron Salts            |  |  |
| 2. | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change  | Absence of Nitrate,<br>Ammonium and Zinc    |  |  |
| 3. | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | Apple green flame   | Presence of Barium                          |  |  |
| 4. | Action of dil.HCl: Salt + dil.HCl and heated.  | No characteristic change  | Absence of Nitrate,<br>Carbonate & Sulphide |  |  |
| 5. | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth.   |   |  |  |
| 6. | Action of MnO <sub>2</sub> and Conc. H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.                   |   |   |  |  |
| 7. |  | No Reddish brown gas  | Absence of Nitrate                          |  |  |
| 8. | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonium salt                    |  |  |
| 9. | Chromyl chloride test: Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                      | Red orange vapours evolved is passed through NaOH in a test tube. Yellow solution is obtained. On adding dil acetic acid and Lead acetate solution, yellow precipitate is formed. |   |  |  |

Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. Curdy white precipitate Presence of Chloride 10 Test for halides: Extract + dil.  $HNO_3 + AgNO_3$ No White precipitate **BaCl<sub>2</sub> test:** Extract + dil. HCl +BaCl<sub>2</sub> Absence of Sulphate Lead acetate test: Absence of Sulphate 12 No White precipitate Extract + CH<sub>3</sub>COOH +Lead acetate **Brown Ring test:** No Brown ring is formed Absence of Nitrate Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** No yellow Absence of phosphate canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 **Test with sodium nitro bruside:** No purple violet Absence of sulphide. or Extract + dil .ammonia + sodium | colouration appears nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. chocolate brown Absence of Ammonium **Analysis Of Ammonium:** No Solution / NaOH + precipitate (Group zero) Original Nessler's reagent **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate of II group 2. Absence is passed Copper Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH Absence of III No White precipitate 3. group Aluminium or Ferric iron Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No Dirty Absence of IV white group precipitate + H<sub>2</sub>S gas is passed Zinc Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH White precipitate Presence of V group Ba 5.  $+ (NH_4)_2CO_3$ or Ca **Confirmatory Test – Barium** Barium (Group V) Original solution + potassium chromate Yellow precipitate Barium is confirmed The given simple salt contains **Result:** Acid radical **Chloride** i)

Basic radical Barium ii)

> The given simple salt is **Barium chloride** iii)

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| AC' | TC CHEMISTRY TUITION CENTR<br>11. AM  | <b>E, 41/1- PWD ROAD, NAGE</b><br>MONIUM CHLORIDE   | RCOIL, 9940847892                           |
|-----|---|---|---|
| NO  | Experiment  | Observation   | Inference                                   |
| 1.  | Colour of the salt  | Colourless  | Absence of Copper and Iron Salts            |
| 2.  | Action of heat: Little of the salt is heated in a dry test tube   | Pungent smelling gas giving dense white fumes with glass rod dipped in conc.HCl   | May be Ammonium                             |
| 3.  | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod  | No characteristic flame   | Absence of Copper, Calcium and Barium       |
| 4.  | Action of dil. HCl: Salt + dil. HCl and heated.   | No characteristic change  | Absence of Nitrate,<br>Carbonate & Sulphide |
| 5.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.   | A colourless gas evolves. It gives a dense white fumes when a glass rod dipped in liquid ammonia is brought close to its mouth.   | Presence of chloride                        |
| 6.  | Action of MnO <sub>2</sub> and Conc. H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc. H <sub>2</sub> SO <sub>4</sub> and heated.                    | turning starch iodide paper   | Presence of chloride                        |
| 7.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                        | No Reddish brown gas  | Absence of Nitrate                          |
| 8.  | Action of dil. NaOH: Salt + dil. NaOH and heated  | A colourless gas with the Pungent smelling gas with the smell of ammonia gives dense white fumes with rod dipped in conc.HCl.   |   |
| 9.  | Chromyl chloride test: Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.  UTHUSAMY M.Sc.(che).MSc(psy)M.Ed., M | Red orange vapours evolved is passed through NaOH in a test tube. Yellow solution is obtained. On adding dil acetic acid and Lead acetate solution, yellow precipitate is formed. | confirmed                                   |

Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. Curdy white precipitate Presence of Chloride 10 Test for halides: Extract + dil.  $HNO_3 + AgNO_3$ **BaCl<sub>2</sub> test:** Extract + dil. HCl +BaCl<sub>2</sub> No White precipitate Absence of Sulphate No White precipitate Lead acetate test: Absence of Sulphate Extract + CH<sub>3</sub>COOH +Lead acetate **Brown Ring test:** No Brown ring is formed Absence of Nitrate Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** No Absence of phosphate yellow canary Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 **Test with sodium nitro bruside:** No violet Absence of sulphide. purple or colouration appears Extract + dil .ammonia + sodium nitro bruside. **Analysis of Basic Radicals Preparation of Original Solution:** Salt + water gives original solution. Analysis Of Ammonium: Original Chocolate brown Presence of Ammonium Solution + NaOH + Nessler's reagent precipitate (Group zero) **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of  $\Pi$ group is passed Copper Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate Absence of III 3. group Aluminium or Ferric iron Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No Dirty 4. white Absence of IV group + H<sub>2</sub>S gas is passed precipitate Zinc Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate Absence of V group Ba 5.  $+ (NH_4)_2CO_3$ or Ca Original solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate Absence of VI group 6. + disodium hydrogen phosphate Magnesium Confirmatory Test – Ammonium **Ammonium** (**Zero group**) Original | Chocolate brown Ammonium is confirmed solution + NaOH + Nessler's reagent precipitate The given simple salt contains **Result:** Acid radical Chloride i) Basic radical Ammonium ii) The given simple salt is Ammonium chloride

iii)

Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 11. AMMONIUM BROMIDE **Experiment Observation Inference** Colour of the salt Colourless Absence of Copper and 1. Iron Salts **Action of heat:** Pungent smelling gas giving Little of the salt is heated in a dry dense white fumes with May be Ammonium test tube glass rod dipped in conc.HCl No characteristic flame Absence of Flame test: Copper, Little of the salt is made into a Calcium and Barium 3. paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod Action of dil. HCl: 4. No characteristic change Absence of Nitrate. Salt + dil. HCl and heated. Carbonate & Sulphide Presence of bromide 5. Action of Conc. H<sub>2</sub>SO<sub>4</sub>: A reddish brown gas turning Salt +Conc. H<sub>2</sub>SO<sub>4</sub> +heated. fluorescein paper moist green evolves. A reddish brown gas turning Presence of Bromide Action of MnO<sub>2</sub> and 6. Conc. moist fluorescein paper red  $H_2SO_4$ : Salt +  $MnO_2$  + Conc.  $H_2SO_4$  and evolves heated. Conc.H<sub>2</sub>SO<sub>4</sub>Copper No Reddish brown gas 7. Action of Absence of Nitrate turning test: Salt + Copper turnings + conc. H<sub>2</sub>SO<sub>4</sub> and heated. Action of dil. NaOH: A colourless gas with the Presence of Ammonium 8. Pungent smelling gas with Salt + dil. NaOH and heated salt the smell of ammonia gives dense white fumes with rod dipped in conc.HCl. Absence of Chloride **Chromyl chloride test:** No red orange vapours Salt +  $K_2Cr_2O_7$  + Conc. $H_2SO_4$  and evolved heated.

Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, **Preparation of Sodium Carbonate extract:** Cooled and filtered. The clear filtrate is called sodium carbonate extract. A pale yellow ppt Presence of Bromide 10 Test for halides: Extract + dil.  $HNO_3 + AgNO_3$ **BaCl<sub>2</sub> test:** Extract + dil. HCl +BaCl<sub>2</sub> No White precipitate Absence of Sulphate No White precipitate Absence of Sulphate 12 | Lead acetate test: Extract + CH<sub>3</sub>COOH +Lead acetate Absence of Nitrate **Brown Ring test:** Extract + No Brown ring is formed 13 dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. **Ammonium molybdate test:** No Absence of phosphate canary yellow Extract + dil HNO<sub>3</sub> + ammonium precipitate molybdate and Conc. HNO<sub>3</sub> 15 violet Absence of sulphide. **Test with sodium nitro bruside:** No purple or Extract + dil .ammonia + sodium colouration appears nitro bruside. Analysis of Basic Radicals **Preparation of Original Solution:** Salt + water gives original solution. Analysis Of Ammonium: Original Chocolate brown Presence of Ammonium Solution + NaOH + Nessler's reagent precipitate (Group zero) **Group Separation** No White precipitate Original Solution + dil. HCl Absence of I group Lead 1. 2. Original Solution + dil. HCl+ H<sub>2</sub>S gas No Black precipitate Absence of II group is passed Copper Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH Absence of III No White precipitate 3. group Aluminium or Ferric iron Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH Dirty Absence of IV No white group precipitate + H<sub>2</sub>S gas is passed Zinc No White precipitate Original Solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH Absence of V group Ba 5.  $+ (NH_4)_2CO_3$ or Ca Original solution + NH<sub>4</sub>Cl + NH<sub>4</sub>OH No White precipitate Absence of VI group 6. + disodium hydrogen phosphate Magnesium Confirmatory Test – Ammonium Ammonium (Zero group) Original | Chocolate Ammonium is confirmed brown solution + NaOH + Nessler's reagent precipitate

The given simple salt contains **Result:** 

- Acid radical Bromide i)
- Basic radical Ammonium ii)
  - The given simple salt is **Ammonium bromide** iii)

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### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

| Ю          | Experiment   | Observation  | Inference                                  |
|------------|--|--|--|
| l.         | Colour of the salt   | Colourless   | Absence of Copper an Iron Salts            |
| 2.         | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change                                 | Absence of Nitrate Ammonium and Zinc       |
| 3.         | Flame test: Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod | No characteristic flame                                  | Absence of Coppe Calcium and Barium        |
| <b>l</b> . | Action of dil.HCl: Salt + dil.HCl and heated.  | No characteristic change                                 | Absence of Nitrate<br>Carbonate & Sulphide |
| 5.         | Action of Conc.H <sub>2</sub> SO <sub>4</sub> : Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  | No characteristic change.                                | Absence of Chloride Bromide & Nitrate      |
| 5.         | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc.<br>H <sub>2</sub> SO <sub>4</sub> and heated.             | No characteristic change.                                | Absence of Chloride,<br>Bromide            |
| 7.         | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.                       | No Reddish brown gas                                     | Absence of Nitrate                         |
| 3.         | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas                                  | Absence of Ammonium salt                   |
| ).         | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                                   | No red orange vapours evolved                            | Absence of Chloride                        |
| SOC        | Salt +Na <sub>2</sub> CO <sub>3</sub> + distilled water, Bolium carbonate extract.   | ion of Sodium Carbonate extoiled, Cooled and filtered. T |  |
| 0          | <b>Test for halides:</b> Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>   | No characteristic precipitate                            | Absence of Chlorid<br>Bromide and Sulphide |
| 1          | BaCl <sub>2</sub> test:Extract + dil. HCl +BaCl <sub>2</sub>   | insoluble in dil.H <sub>2</sub> SO <sub>4</sub>          | •  |
| 2          | <b>Lead acetate test:</b><br>Extract + CH <sub>3</sub> COOH +Lead acetate  | White precipitate soluble in ammonium acetate.           | Presence of Sulphate                       |

| Dedi | cation!   | Determination!!                         | Distinction!!!                                       |
|------|---|---|--|
| AC   | TC CHEMISTRY TUITION CENTRE,  | 41/1- PWD ROAD, NAGE                    | RCOIL, 9940847892                                    |
| 13   | Brown Ring test: Extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> and conc. H <sub>2</sub> SO <sub>4</sub> is added along the sides of the test tube . | No Brown ring is formed                 | Absence of Nitrate                                   |
| 14   | Ammonium molybdate test:  Extract + dil HNO <sub>3</sub> + ammonium   | No canary yellow precipitate            | Absence of phosphate                                 |
| 15   | molybdate and Conc. HNO <sub>3</sub> <b>Test with sodium nitro bruside:</b> Extract + dil .ammonia + sodium nitro bruside.  | No purple or violet colouration appears | Absence of sulphide.                                 |
|      | Analysis of Basi  | c Radicals                              |  |
|      | eparation of Original Solution: alt + water gives original solution.  |   |  |
| 1.   | Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  | No chocolate brown precipitate          | Absence of Ammonium (Group zero)                     |
|      |   | Group Separation                        |  |
| 1.   | Original Solution + dil. HCl  | No White precipitate                    | Absence of I group Lead                              |
| 2.   | Original Solution + dil. HCl+ H <sub>2</sub> S gas is passed  | No Black precipitate                    | Absence of II group<br>Copper                        |
| 3.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH   | No White precipitate                    | Absence of III group<br>Aluminium or Ferric<br>iron. |
| 4.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH + H <sub>2</sub> S gas is passed  | No Dirty white precipitate              | Absence of IV group Zinc                             |
| 5.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH<br>+ (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>  | No White precipitate                    | Absence of V group Ba or Ca                          |
| 6.   | Original solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH + disodium hydrogen phosphate   | White precipitate                       | Presence of VI group<br>Magnesium                    |
|      | Confirmatory Test – M   | lagnesium                               | _  |
|      | Magnesium (Group VI) Original solution + NaOH + Magneson reagent  | Blue precipitate                        | Magnesium is confirmed                               |

**Result:** The given simple salt contains

- i) Acid radical **Sulphate**
- ii) Basic radical Magnesium
  - iii) The given simple salt is Magnesium sulphate

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### ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892

| Ю   | Experiment   | Observation   | Inference                            |
|-----|--|---|--------------------------------------|
| 1.  | Colour of the salt   | Colourless  | Absence of Copper an Iron Salts      |
| 2.  | Action of heat: Little of the salt is heated in a dry test tube  | No characteristic change  | Absence of Nitrate Ammonium and Zinc |
|     | Flame test:  | No characteristic flame   | Absence of Coppe                     |
| 3.  | Little of the salt is made into a paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod |   | Calcium and Barium                   |
| ļ.  | Action of dil.HCl:   | Colourless, Odourless gas   | <b>V</b>                             |
| - • | Salt + dil.HCl and heated.   | with brisk effervescence turning lime water milky                 | Presence of Carbonat confirmed       |
| 5.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> :  | No characteristic change.   | Absence of Chlorid                   |
|     | Salt +Conc. H <sub>2</sub> SO <sub>4</sub> +heated.  |   | Bromide & Nitrate                    |
| Ó.  | Action of MnO <sub>2</sub> and Conc.<br>H <sub>2</sub> SO <sub>4</sub> : Salt + MnO <sub>2</sub> + Conc.<br>H <sub>2</sub> SO <sub>4</sub> and heated. | No characteristic change.   | Absence of Chloride,<br>Bromide      |
| 7.  | Action of Conc.H <sub>2</sub> SO <sub>4</sub> Copper turning test: Salt + Copper turnings + conc. H <sub>2</sub> SO <sub>4</sub> and heated.           | No Reddish brown gas  | Absence of Nitrate                   |
| 3.  | Action of dil. NaOH: Salt + dil. NaOH and heated   | No Pungent smelling gas   | Absence of Ammonius salt             |
| ).  | Chromyl chloride test:<br>Salt + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> + Conc.H <sub>2</sub> SO <sub>4</sub> and heated.                       | No red orange vapours evolved                                     | Absence of Chloride                  |
|     | <b>Preparation</b>   | of Sodium Carbonate extrac  | <u>t</u> :                           |
|     | Salt +Na <sub>2</sub> CO <sub>3</sub> + distilled water, Be  | oiled, Cooled and filtered. T                                     | he clear filtrate is calle           |
|     | lium carbonate extract.  |   | ı                                    |
| 0   | Test for halides:  | No characteristic   | Absence of Chlorid                   |
|     | Extract + dil. HNO <sub>3</sub> + AgNO <sub>3</sub>  | precipitate   | Bromide and Sulphide                 |
| 1   | BaCl <sub>2</sub> test:Extract + dil. HCl +BaCl <sub>2</sub>   | White precipitate insoluble in dil.H <sub>2</sub> SO <sub>4</sub> | •                                    |
| 2   | Lead acetate test:   | White precipitate soluble   | Presence of Sulphate                 |
|     | Extract + CH <sub>3</sub> COOH +Lead acetate   | in ammonium acetate.  |                                      |

|                             |   | Determination!!                         | Distinction!!!                                       |  |  |
|-----------------------------|---|---|--|--|--|
| AC                          | TC CHEMISTRY TUITION CENTRE,  |   | RCOIL, 9940847892                                    |  |  |
| 13                          | Brown Ring test: Extract + dil.H <sub>2</sub> SO <sub>4</sub> + freshly prepared FeSO <sub>4</sub> and conc. H <sub>2</sub> SO <sub>4</sub> is added along the sides of the test tube . | No Brown ring is formed                 | Absence of Nitrate                                   |  |  |
| 14                          | Ammonium molybdate test:<br>Extract + dil HNO <sub>3</sub> + ammonium<br>molybdate and Conc. HNO <sub>3</sub>   | No canary yellow precipitate            | Absence of phosphate                                 |  |  |
| 15                          | <b>Test with sodium nitro bruside:</b> Extract + dil .ammonia + sodium nitro bruside.   | No purple or violet colouration appears | Absence of sulphide.                                 |  |  |
| Analysis of Basic Radicals  |   |   |  |  |  |
| Pr                          | eparation of Original Solution:   |   |  |  |  |
| S                           | alt + dil. HNO <sub>3</sub> gives original solution.  |   |  |  |  |
| 1.                          | Analysis Of Ammonium: Original Solution + NaOH + Nessler's reagent  | No chocolate brown precipitate          | Absence of Ammonium (Group zero)                     |  |  |
| Group Separation            |   |   |  |  |  |
| 1.                          | Original Solution + dil. HCl  | No White precipitate                    | Absence of I group Lead                              |  |  |
| 2.                          | Original Solution + dil. HCl+ H <sub>2</sub> S gas is passed  | No Black precipitate                    | Absence of II group<br>Copper                        |  |  |
| 3.                          | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH   | No White precipitate                    | Absence of III group<br>Aluminium or Ferric<br>iron. |  |  |
| 4.                          | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH + H <sub>2</sub> S gas is passed  | precipitate                             | Absence of IV group<br>Zinc                          |  |  |
| 5                           | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH<br>+ (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>  | No White precipitate                    | Absence of V group Ba or Ca                          |  |  |
| 6.                          | Original solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH + disodium hydrogen phosphate   | White precipitate                       | Presence of VI group<br>Magnesium                    |  |  |
| Confirmatory Test - Calcium |   |   |  |  |  |
|                             | Magnesium (Group VI) Original solution + NaOH+Magneson reagent  | Blue precipitate                        | Magnesium is confirmed                               |  |  |

**Result:** The given simple salt contains

- i) Acid radical **Carbonate**
- ii) Basic radical Magnesium
  - iii) The given simple salt is Magnesium carbonate

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Dedication! Determination!! Distinction!!! ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 15. MAGESIUM PHOSPHATE **Experiment Observation Inference** Colour of the salt Colourless Absence of Copper and 1. Iron Salts Nitrate. **Action of heat:** No characteristic change Absence of Little of the salt is heated in a dry Ammonium and Zinc test tube Flame test: No characteristic flame Absence of Copper, 3. Little of the salt is made into a Calcium and Barium paste with conc. HCl in a watch glass and it is burnt by the non luminous part of the Bunsen flame using a glass rod **Action of dil.HCl:** 4. No characteristic change Absence of Nitrate. Salt + dil.HCl and heated. Carbonate & Sulphide No characteristic change. Action of Conc.H<sub>2</sub>SO<sub>4</sub>: Absence of Chloride, 5. Salt +Conc. H<sub>2</sub>SO<sub>4</sub> +heated. Bromide & Nitrate Absence of Chloride, Action of MnO<sub>2</sub> and Conc. No characteristic change. 6.  $H_2SO_4$ : Salt + MnO<sub>2</sub> + Conc. Bromide H<sub>2</sub>SO<sub>4</sub> and heated. Action of Conc.H<sub>2</sub>SO<sub>4</sub>Copper No Reddish brown gas 7. Absence of Nitrate turning test: Salt + Copper turnings + conc. H<sub>2</sub>SO<sub>4</sub> and heated. No Pungent smelling gas 8. Action of dil. NaOH: Absence of Ammonium Salt + dil. NaOH and heated salt No red Absence of Chloride **Chromyl chloride test:** orange 9. vapours Salt +  $K_2Cr_2O_7$  + Conc. $H_2SO_4$  and | evolved heated. **Preparation of Sodium Carbonate extract:** Salt +Na<sub>2</sub>CO<sub>3</sub> + distilled water, Boiled, Cooled and filtered. The clear filtrate is called sodium carbonate extract. 10 Test for halides: No characteristic Absence of Chloride. Extract + dil.  $HNO_3 + AgNO_3$ precipitate Bromide and Sulphide BaCl<sub>2</sub> test:Extract + dil. HCl +BaCl<sub>2</sub> No White precipitate Absence of Sulphate No White precipitate Absence of Sulphate 12 Lead acetate test: Extract + CH<sub>3</sub>COOH +Lead acetate No Brown ring is formed 13 **Brown Ring test:** Absence of Nitrate Extract + dil.H<sub>2</sub>SO<sub>4</sub> + freshly prepared FeSO<sub>4</sub> and conc. H<sub>2</sub>SO<sub>4</sub> is added along the sides of the test tube. E.MUTHUSAMY M.Sc.(che), MSc(psy), M.Ed., MPhil., M.A.(Eng), MA(Soc), MA(P.admin), DMLT., BLISc., PGDCA

| Dedication!  |   | Determination!!        | Distinction!!!          |  |  |
|--|---|------------------------|-------------------------|--|--|
| ACTC CHEMISTRY TUITION CENTRE, 41/1- PWD ROAD, NAGERCOIL, 9940847892 |   |                        |                         |  |  |
| 14   | Ammonium molybdate test:                                    | A canary yellow ppt is | Presence of phosphate   |  |  |
|  | Extract + dil HNO <sub>3</sub> + ammonium                   | formed.                |                         |  |  |
|  | molybdate and Conc. HNO <sub>3</sub>                        |                        |                         |  |  |
| 15   | Test with sodium nitro bruside:                             | No purple or violet    | Absence of sulphide.    |  |  |
|  | Extract + dil .ammonia + sodium                             | colouration appears    |                         |  |  |
|  | nitro bruside.  |                        |                         |  |  |
| Analysis of Basic Radicals   |   |                        |                         |  |  |
| Preparation of Original Solution:                                    |   |                        |                         |  |  |
| Salt + water gives original solution.                                |   |                        |                         |  |  |
| 1.   |   | No chocolate brown     |                         |  |  |
|  | Original Solution + NaOH +                                  | precipitate            | (Group zero)            |  |  |
|  | Nessler's reagent   |                        |                         |  |  |
| Group Separation   |   |                        |                         |  |  |
| 1.   | Original Solution + dil. HCl                                | No White precipitate   | Absence of I group Lead |  |  |
| 2.   | Original Solution + dil. HCl+ H <sub>2</sub> S gas          | No Black precipitate   | Absence of II group     |  |  |
|  | is passed   |                        | Copper                  |  |  |
| 3.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH | No White precipitate   | Absence of III group    |  |  |
|  |   |                        | Aluminium or Ferric     |  |  |
|  |   |                        | iron.                   |  |  |
| 4.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH | No Dirty white         | Absence of IV group     |  |  |
|  | + H <sub>2</sub> S gas is passed                            | precipitate            | Zinc                    |  |  |
| 5.   | Original Solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH | No White precipitate   | Absence of V group Ba   |  |  |
|  | $+(NH_4)_2CO_3$   |                        | or Ca                   |  |  |
| 6.   | Original solution + NH <sub>4</sub> Cl + NH <sub>4</sub> OH | White precipitate      | Presence of VI group    |  |  |
|  | + disodium hydrogen phosphate                               |                        | Magnesium               |  |  |
| Confirmatory Test – Magnesium  |   |                        |                         |  |  |
|  | Magnesium (Group VI)  |                        |                         |  |  |
|  |   | Blue precipitate       | Magnesium is confirmed  |  |  |
| ]  | Magneson reagent  |                        |                         |  |  |
| Desult. The given simple self contains                               |   |                        |                         |  |  |

**Result:** The given simple salt contains

i) Acid radical **Sulphate** 

ii) Basic radical Magnesium iii)The given simple salt is Magnesium sulphate

#### **WE WISH U ALL THE BEST**

### **ACTC**

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