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### CHEMICAL TESTS FOR SOME CATIONS AND ANIONS

#### Test for Acidic Nature :

- a) **pH Paper Test:** Moist the pH paper with distilled water and impregnate it with exhibit as such or its distilled water extract and observe the pH. pH less than 7 indicates the presence of acid and more than 7 indicates the presence of alkali.

#### Alternate Method

- a) **Litmus Paper Test :** Moist the blue litmus paper with distilled water and impregnate it with exhibit as such or its distilled water extract and observe the colour change of the paper. Colour changing from blue to red indicates the presence of acid. If red litmus paper changes to blue, than it indicates the presence of alkali.

#### Test for Chloride :

- a) **Silver Nitrate Test:** Take the appropriate portion of the exhibit in a test tube and add 1 drop of nitric acid followed by few drops of 0.2 M silver nitrate solution.  
A white curdy precipitate is obtained which is soluble in excess of ammonium hydroxide solution but insoluble in water and dilute nitric acid.

b) **Test With Sulphuric Acid:** Take the appropriate portion of the exhibit in a test tube and add few drops of conc. Sulphuric acid if required warm it. Hydrogen chloride gas is evolved, which can be tested by blue litmus paper turns to red or by formation of white clouds of ammonium chloride when a glass rod moistened with ammonia solution is brought near the mouth of test tube.

## **Test for Nitric Acid**

### **Test for Acidic Nature:**

a) **pH Paper Test:** Moist the pH paper with distilled water and impregnate it with exhibit as such or its distilled water extract and observe the pH. PH less than 7 indicates the presence of acid.

### **Alternate Method**

b) **Litmus Paper Test:** Moist the blue litmus paper with distilled water and impregnate it with exhibit as such or its distilled water extract and observe the colour change of the paper. Colour changing from blue to red indicates the presence of acid.

**Test for Nitrate:** Depending upon the nature of exhibits and availability of resources, any one of the following methods can be used for the detection of nitrate. Take the appropriate portion of the exhibit in a beaker add distilled water, shake well and filter it. The filtrate may be used for performing the tests.

### **a) Ring Test:**

(i) Add about 3 ml of a freshly prepared saturated solution of ferrous sulphate to about 2 ml of the nitrate solution (filtrate of the exhibit) in a test tube and pour 3-5 ml conc. sulphuric acid slowly down the side of the test tube so

that acid forms a layer beneath the mixture. A brown ring will form where the liquids meet which indicates the positive test for the presence of nitrate.

(ii) Add about 4 ml of conc. sulphuric acid slowly to about 2 ml of the nitrate solution (filtrate of the exhibit) in a test tube and mix the liquids thoroughly and cool the mixture in tap water. Now a saturated solution of ferrous sulphate is added slowly down the inner sidewall of the test tube to form a layer on the top of the liquid. Formation of a brown ring at the junction of two liquids indicates the presence of nitrate.

**b) Diphenylamine Reagent Test:** To a small amount of diphenylamine reagent (dissolve 0.5 gm. Of diphenylamine in 85 ml conc. sulphuric acid and dilute to 100 ml with water) in a test tube add a small portion of the filtrate carefully to the side of the test tube, a blue ring at the junction indicates the presence of nitrate.

**b) Ferrous Sulphate Test:** To a drop of filtrate on a spot plate add a crystal of ferrous sulphate (pin head), a drop of conc. sulphuric acid is allowed to run in at the side. In the presence of nitrate, a brown ring is formed around the ferrous sulphate crystal.

**c) Brucine Test :** To a few drop of filtrate, a solution of brucine (0.02% in sulphuric acid, prepare immediately before use) is added on a spot plate, in the presence of nitrate a red colour is developed, on standing it changes to yellowish red.