OBJECTIVE

To determine the pH of soils by Electrometric method.

APPARATUS USED

i)pH meter-fitted with glass and calomel reference electrode
ii) Glass beakers-3 Nos. ,each of 200 ml capacity with glass cover
iii) Stirring rods-2 Nos.
iv)Wash bottle for distilled water
v)Chemical balance capable of weighing a minimum 0.0002g-One
vi)Sieve (425 micron)- 1 Nos.
vii)Electric stirrer-(with dispersion cup)-1 Nos.

viii)Potassium chloride fully saturated KCl solution
ix)Buffer solution

Soil pH meter

DEFINITION

pH is a measure of the acidity or basicity of an aqueous solution. A Solution is said to be neutral, with a pH close to 7.0 at 25 °C (77 °F). Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are

basicor alkaline. The pH value of a solution is expressed as the logarithm of the reciprocal of hydrogen ion concentration

$$\mathrm{pH} = -\log_{10}(a_{H^+}) = \log_{10}\left(\frac{1}{a_{H^+}}\right)$$

Where, a_{H^+}=activity of hydrogen ion in soil suspension.

PRINCIPLE

This method is based on the principle that the solution to be tested can be considered as an electrolyte of a voltaic cell. The reference electrode remains at a constant voltage w.r.t. the solution and is not affected by the changes in pH values. The other electrodes of such type that its potential is affected by the pH of the solution under test. The measured voltage of the cell immersed in the unknown pH solutions is converted to pH units.

PROCEDURE

i) Take 40 gm oven dried soil sample passing through 425 micron sieve in the dispersion cup and add 100 ml distilled water. Adjust the cup in the electric and run the apparatus for 30 min. After the stirring process, transfer the solution to a beaker and cover the beaker with a glass cover. Allow the solution to stand overnight. Stir the solution again using rod just before testing.

ii) Calibrate the pH meter using standard buffer solution according to the instruction manual provided a particular instrument by the manufacturer. The buffer solution also should be prepared according to the instructions provided with it. Use the buffer solution of pH near to the expected pH value of the soil suspension.

iii) Wash the electrodes by distilled water and then gently immerse them in a breaker containing soil suspension. Take 2-3 readings of pH value and stir the suspension briefly in between each reading.

iv) Take both the electrodes out of the suspension and wash with distilled water.

v) Report the pH value nearest to 0.1 pH.

OBSERVATIONS

OBSERVATION NO.	pH value of soil suspension
1	
2	
3	
4	
5	

PRECAUTION

1) For the preparation of soil suspension, soil to water ratio has been recommended as 1:2.5.
2) Care should be taken to maintain the KCl solution in the calomel electrode completely saturated. 3) Buffer solution should be freshly prepared.

REFERENCES

http://en.wikipedia.org/wiki/PH

https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/GTM-24b.pdf

QUIZ

1) What are sources of soil pH?

2) What are effects of soil pH on plant growth?

3) What are the methods opted for the determination of pH of soils?

4) What is the working principle of electrometric method for the determination of pH of soils?

Experiment no 3 pH Test