

Aim:

To determine the pH of the given samples using pH paper or universal indicator. The samples whose pH has to be determined are-

1. Dilute CH_3COOH
2. Dilute NaOH
3. Salt NaCl
4. Dilute NaHCO_3
5. Water
6. Lemon juice

Materials required:

1. Six test tubes
2. Test tube stand
3. Dilute acid CH_3COOH
4. Dilute base NaOH
5. Salt NaCl (preparation: dissolve 1 gram salt in 10 mL distilled water)
6. Water
7. Lemon juice
8. Dilute NaHCO_3
9. Glass rod
10. Measuring cylinder (10 mL)
11. Standard pH colour chart
12. pH paper
13. Glass rod
14. Dropper
15. Universal indicator

Theory:

What is pH?

pH is a measure of hydrogen ion concentration to determine the alkalinity or acidity of a solution.

- If the pH value of a solution is less than 7 it is an acidic solution
- If the pH value of a solution is greater than 7 it is a basic solution
- If the pH value of a solution is equal to 7 it is a neutral solution

What is pH scale?

The [pH scale](#) consists of values which range from 0 (very acidic) to 14 (very alkaline). The numbers on the scale help to determine the hydrogen ion concentration.

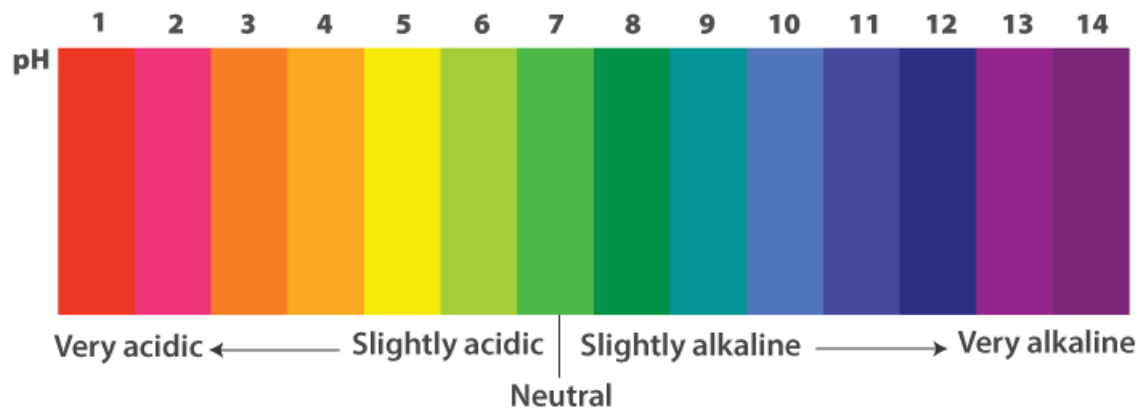
What is pH paper?

pH paper can help us know if a solution is basic, acidic or neutral. When the pH paper is dipped into a solution whose pH has to be determined, a colour will be developed. This colour is compared with the standard pH colour chart. Instead of pH paper, we can also use universal indicator paper or universal indicator solution.

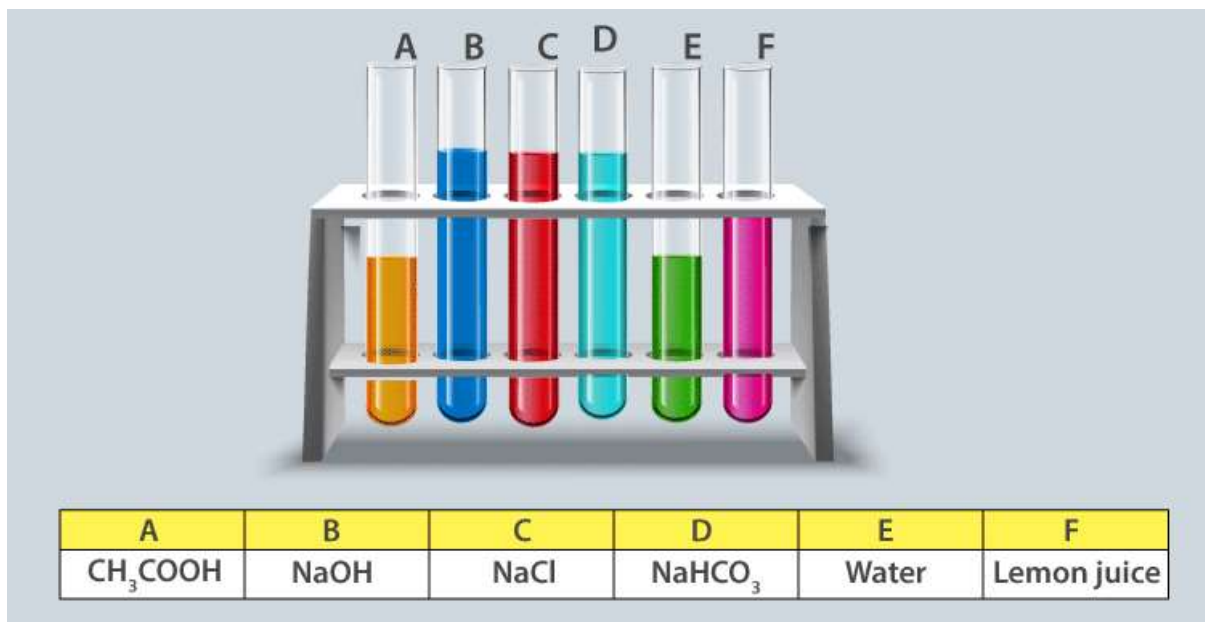
What is universal indicator?

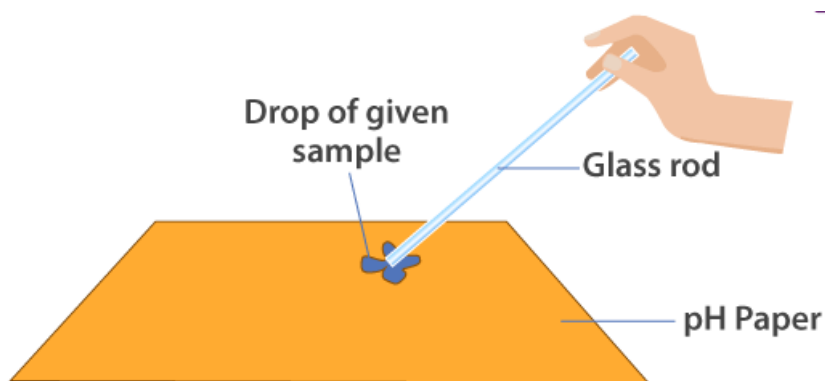
A universal indicator is a mix of pH indicator solutions that are designed to determine the pH of solutions over a wide range of values. Put a drop of solution on the universal pH indicator paper. The colour developed on the paper is matched with the standard pH colour chart.

pH value chart:



Experimental Setup:





Testing the pH of a sample by putting a drop on pH paper by glass rod

Procedure:

1. Wash six test tubes with distilled water and put them on test tube stand and label them A, B, C, D, E, F.
2. Add 2ml of CH_3COOH in test tube A, Add 2ml of NaOH in test tube B, Add 2ml of NaCl in test tube C, Add 2ml of NaHCO_3 in test tube D, Add 2ml of Water in test tube E, Add 2ml of Lemon juice in test tube F.
3. Take white tile, place 6 pH paper and label them A, B, C, D, E, F.
4. Use a dropper or glass rod to put the respective sample solutions on the labelled pH paper placed on the white tile.
5. Observe the colour change.

Observation:

Sample	Colour on pH paper
A	Orange
B	Dark blue
C	Red
D	Light blue
E	Green
F	Pink

Result and Conclusion:

Test tube	Solution	pH colour paper	pH	Nature
Sample A	CH_3COOH	Orange	3	Weak acid

Sample B	NaOH	Dark blue	14	Strong base
Sample C	NaCl	Red	1	Strong acid
Sample D	NaHCO ₃	Light blue	9	Weak base
Sample E	Water	Green	7	Neutral
Sample F	Lemon juice	Pink	2	Weak acid

Precautions to be taken during the experiment:

- Use freshly prepared test sample for the experiment.
- The fruit juice sample should also be fresh to get the proper pH values.
- Glass rod or dropper used for one sample should be washed thoroughly before using it for the other samples.