To determine the pH of various samples of NaOH solution using: (i) pH paper, and (ii) universal indicator solution

Requirements

Test tubes, measuring cylinder, dropper, pH paper, universal indicator solution, 0.1 M NaOH, 0.01 M NaOH, 0.001 M NaOH, 0.0001 M NaOH and 0.00001 M NaOH.

Procedure

1. **Using pH Paper.** Put 2-3 drops of the sample solution on pH paper by means of a glass rod and observe the colour on the pH paper. Now compare the shade of colour formed with various colours given on the 'pH indicator chart'. From this, note the approximate pH of the sample solution and record in the table.
2. **Using Universal Indicator Solution.** Take five test tubes, clean and dry them. Take 5 ml of each given solution in different test tubes with the help of measuring cylinder. Now put 2-3 drops of universal indicator in each test tube by means of a dropper. Note the colour of solution in each test tube and compare its colour with different colour shades as given in the 'pH indicator chart'. After comparing the colour in each tube, note the pH of solution and record in the table.

Observations And Results

Approximate pH of Sample Solutions of NaOH

Sample No.	Molarity of NaOH solution	For pH paper		For universal indicator		Calculated pH = – log $[H_3O^+]$
		Colour produced an pH paper	Approximate pH value	Colour produced in solution	Approximate pH value	
1.	10^{-1} M					
2.	10^{-2} M					
3.	10^{-3} M					
4.	10^{-4} M					
5.	10^{-5}M					

For calculating pH,
find H_3O^+ ion concentration
$[OH^-]$ $[H_30^+]$ = 1 x 10^{-14}

Or

$[H_30^+] = \frac{1\times10^{-14}}{[OH^-]}$

Now,

pH = – log $[H_3O^+]$

Conclusion

(i) The pH of NaOH solutions is greater than 7.
(ii) The pH of NaOH solution ..... with decrease in concentration.