

Dilutions and pH Measurement

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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Learning Objectives



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We will learn to measure,



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We will learn to measure,

- ▶ **Change in pH for solutions of acid and base on dilution**



Learning Objectives

We will learn to measure,

- ▶ **Change in pH for solutions of acid and base on dilution**
- ▶ **Variation in pH by common-ion effect for weak acids and bases**



Pre-requisites



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▶ ChemCollective Vlabs interface



Pre-requisites

- ▶ **ChemCollective Vlabs interface**
- ▶ **If not for relevant tutorials please visit our website**
www.spoken-tutorial.org



System Requirement



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▶ Mac OS v 10.10.5



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- ▶ **ChemCollective Vlabs v 2.1.0**



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- ▶ **Java v 8**



Measurement of pH



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10 times dilution:



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▶ **0.1 M HCl to 0.01 M HCl**



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- ▶ **0.1 M NaOH to 0.01 M NaOH**



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Measurement of pH

10 times dilution:

- ▶ **0.1 M HCl to 0.01 M HCl**
- ▶ **0.1 M NaOH to 0.01 M NaOH**

2 ml of 0.1 M HCl/NaOH is diluted to 20 ml with distilled water



Results



Results

Concentration	pH	pH after dilution
0.1 M HCl	1.0	2.0
0.1 M NaOH	13.0	12.0

pH is a logarithmic scale, for every 10 times dilution, pH changes by 1 unit



Common ion Effect



Common ion Effect

- ▶ **Ethanoic acid and its conjugate base, sodium ethanoate**



Common ion Effect

- ▶ **Ethanoic acid and its conjugate base, sodium ethanoate**
- ▶ **Ammonia and its conjugate acid, ammonium chloride**



Results



Results

Solution	pH	Solution	pH
1 M Ethanoic acid	2.38	1 M Ethanoic acid + 1 M Sodium ethanoate	4.76
1 M Ammonia	11.62	1 M Ammonia + 1 M Ammonium chloride	9.25



Summary



Summary

We have learnt to measure,

- ▶ Change in pH for solutions of 0.1 M HCl and 0.1 M NaOH on dilution**
- ▶ Variation in pH by common-ion effect for ethanoic acid and ammonia solutions**



Assignment



Assignment

Measure change in pH for,



Assignment

Measure change in pH for,

1. **1 M and 0.01 M Sulphuric acid**



Assignment

Measure change in pH for,

1. 1 M and 0.01 M Sulphuric acid
2. 1 M and 0.01 M Sodium hydroxide



About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



Forum for specific questions

- ▶ Do you have questions in THIS Spoken Tutorial?
- ▶ Please visit <http://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ Someone from our team will answer them



Acknowledgements

- ▶ **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- ▶ **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- ▶ **More information on this Mission is available at**

<http://spoken-tutorial.org /NMEICT-Intro>

