

TOPIC 8 ACIDS AND BASES :pH SUMMARY NOTES

Summary

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- The pH scale:

- 1 ◦ the pH scale is an indication of the hydrogen ion concentration and runs from below 0 to above 14;
- 2 ◦ a neutral solution has equal concentrations of $\text{H}^+(\text{aq})$ and $\text{OH}^-(\text{aq})$ ions;
- 3 ◦ acidic solutions have a higher concentration of $\text{H}^+(\text{aq})$ ions than $\text{OH}^-(\text{aq})$ and have a pH below 7;
- 4 ◦ alkaline solutions have a higher concentration of $\text{OH}^-(\text{aq})$ ions than $\text{H}^+(\text{aq})$ ions and have a pH above 7;
- 5 ◦ dilution of an acidic solution with water will decrease the concentration of $\text{H}^+(\text{aq})$ and the pH will increase towards 7;
- 6 ◦ dilution of an alkaline solution with water will decrease the concentration of $\text{OH}^-(\text{aq})$ and the pH will decrease towards 7.

- Water equilibrium:

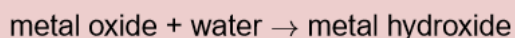
- 7 ◦ water is neutral as it dissociates according to the equation:
$$\text{H}_2\text{O} (\text{l}) \rightleftharpoons \text{H}^+(\text{aq}) + \text{OH}^-(\text{aq})$$
- 8 ◦ producing equal concentrations of hydrogen and hydroxide ions;
- 9 ◦ at any time, only a few water molecules are dissociated into free ions;
10. ◦ the $\rightleftharpoons$ symbol indicates that a reaction is reversible and occurs in both directions.

- Bases:

- 11 ◦ metal oxides, metal hydroxides, metal carbonates and ammonia neutralise acids and are called bases. Those bases that dissolve in water form alkaline solutions.

- Oxides and pH:

- 12 ◦ soluble non-metal oxides dissolve in water forming acidic solutions;
- 13 ◦ soluble metal oxides dissolve in water to form alkaline solutions:



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We can use the following triangle to carry out calculations involving concentration and volume.

