	Marks
• Above what concentration of H_3O^+ is a solution considered to be acidic at 25 °C?	**3**

Neutral at 25 °C corresponds to $[H_3O^+(aq)] = 10^{-7}$ M and pH = 7.0. Acidic solutions have pH < 7.0 and $[H_3O^+(aq)] > 10^{-7}$ M

Answer: **10^{-7} M**

At 95 °C the auto ionisation constant of water, K_w, is 45.7×10^{-14}. What is the pH of a neutral solution at 95 °C?

K_w refers to the auto ionisation reaction, $2H_2O(l) \rightleftharpoons H_3O^+(aq) + OH^-(aq)$ so that $K_w = [H_3O^+(aq)][OH^-(aq)]$. As the solution is neutral, $[H_3O^+(aq)] = [OH^-(aq)]$. Hence:

$K_w = [H_3O^+(aq)][OH^-(aq)] = [H_3O^+(aq)]^2 = 45.7 \times 10^{-14}$
$[H_3O^+(aq)] = 6.76 \times 10^{-7}$ M
pH = $-\log_{10}[H_3O^+(aq)] = -\log_{10}(6.76 \times 10^{-7}) = 6.17$

pH = **6.17**