Question 31 **(8 marks)**

Water is capable of self-ionisation.

(a) Write an equation for the self-ionisation of water. (2 marks)

(b) Write the equilibrium constant expression for the self-ionisation of water. (1 mark)

(c) The equilibrium constant for the self-ionisation of water K_w is 1.00×10^{-14} at 25 °C. What does this value indicate about this reaction? (1 mark)

The K values for the self-ionisation of water at 100.0 kPa are given here for a number of different temperatures.

Temperature (°C)	K value
0	0.114×10^{-14}
25	1.00×10^{-14}
50	5.48×10^{-14}
75	19.9×10^{-14}
100	51.3×10^{-14}

(d) Calculate the pH of water at 50 °C. (2 marks)

(e) Is water acidic, basic or neutral at 50 °C? State a reason for your answer. (2 marks)