

Name of the Student: _____

Max. Marks : 14 Marks

Time : 14 Minutes

Q1.

In this question, give all values of pH to two decimal places.

Calculating the pH of aqueous solutions can involve the use of equilibrium constants such as K_w and K_a

K_w is the ionic product of water. The value of K_w is $5.48 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$ at 50°C .

(a) (i) Write an expression for pH.

(1)

(ii) Write an expression for K_w

(1)

(b) (i) Calculate the pH of pure water at 50°C .

(2)

(ii) Suggest why this pure water is **not** acidic.

(1)

(iii) Calculate the pH of $0.140 \text{ mol dm}^{-3}$ aqueous sodium hydroxide at 50°C .

(3)

- (c) Calculate the pH of the solution formed when 25.0 cm^3 of $0.150 \text{ mol dm}^{-3}$ aqueous sulfuric acid are added to 30.0 cm^3 of $0.200 \text{ mol dm}^{-3}$ aqueous potassium hydroxide at 25°C . Assume that the sulfuric acid is fully dissociated.

(6)

(Total 14 marks)