Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 2

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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

Hydrochloric acid is a strong acid and ethanoic acid is a weak acid.

(a) State the meaning of the term strong acid.

_____

_____

(1)

(b) In an experiment, 10.35 cm^3 of 0.100 mol dm^{-3} hydrochloric acid are added to 25.0 cm^3 of 0.150 mol dm^{-3} barium hydroxide solution.

Calculate the pH of the solution that forms at 30 °C

$K_w = 1.47 \times 10^{-14}$ mol^2 dm^{-6} at 30 °C

Give your answer to 2 decimal places.

pH _____

(6)

(c) The pH of water at 30 °C is 6.92

Give the reason why water is neutral at this temperature.

_____

_____

(1)

(d) Identify the oxide that could react with water to form a solution with pH = 2

Tick (✔) **one** box.

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Al_2O_3 ☐

Na_2O ☐

SiO_2 ☐

SO_2 ☐

(1)

(e) Give the expression for the acid dissociation constant (K_a) for ethanoic acid (CH_3COOH).

K_a

(1)

(f) A buffer solution contains 0.025 mol of sodium ethanoate dissolved in 500 cm^3 of 0.0700 mol dm^{-3} ethanoic acid at 25 °C

A sample of 5.00 cm^3 of 2.00 mol dm^{-3} hydrochloric acid is added to this buffer solution.

Calculate the pH of the solution formed.

For ethanoic acid, $K_a = 1.76 \times 10^{-5}$ mol dm^{-3} at 25 °C

pH _____

(5)

(Total 15 marks)

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Q2.

(a) When anhydrous aluminium chloride reacts with water, solution **Y** is formed that contains a complex aluminium ion, **Z**, and chloride ions.

Give an equation for this reaction.

_____

(1)

(b) Give an equation to show how the complex ion **Z** can act as a Brønsted–Lowry acid with water.

_____

(1)

(c) Describe **two** observations you would make when an excess of sodium carbonate solution is added to solution **Y**.

Give an equation for the reaction. In your equation, include the formula of each complex aluminium species.

Observation 1 _____

_____

Observation 2 _____

_____

Equation _____

(3)

(d) Aqueous potassium hydroxide is added, until in excess, to solution **Y**.

Describe **two** observations you would make.
For each observation give an equation for the reaction that occurs.
In your equations, include the formula of each complex aluminium species.

Observation 1 _____

_____

Equation 1 _____

Observation 2 _____

_____

Equation 2 _____

(4)

(Total 9 marks)

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