Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1_Acids And Bases

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

A mixture of methanoic acid and sodium methanoate in aqueous solution acts as an acidic buffer solution.

The equation shows the dissociation of methanoic acid.

$$HCOOH(aq) \rightleftharpoons HCOO^{-}(aq) + H^{+}(aq)$$

Calculate the mass, in g, of sodium methanoate (HCOONa) that must be added to 25.0 cm^3 of 0.100 mol dm^{-3} methanoic acid to produce a buffer solution with pH = 4.05 at 298 K

For methanoic acid, pK_a = 3.75 at 298 K

Assume that the volume of the solution remains constant.

Mass _____ g

(Total 5 marks)

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Q2.

Propanoic acid (C_2H_5COOH) is a weak acid.

The acid dissociation constant (K_a) for propanoic acid is 1.35×10^{-5} mol dm^{-3} at 25 ^{o}C

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

_____

_____

(1)

(b) Give an expression for the acid dissociation constant for propanoic acid.

K_a

(1)

(c) A student dilutes 25.0 cm^3 of 0.500 mol dm^{-3} propanoic acid by adding water until the total volume is 100.0 cm^3

Calculate the pH of this diluted solution of propanoic acid.

Give your answer to 2 decimal places.

pH _____

(4)

(d) A buffer solution with a pH of 4.50 is made by dissolving *x* g of sodium propanoate (C_2H_5COONa) in a solution of propanoic acid. The final volume of buffer solution is 500 cm^3 and the final concentration of the propanoic acid is 0.250 mol dm^{-3}

Calculate *x* in g
For propanoic acid, $K_a = 1.35 \times 10^{-5}$ mol dm^{-3}

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x _____ g

(6)

(Total 12 marks)

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