

CHEM 1105 TEST#5

NAME:

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Student Number:

1. Coffee is acidic with an approximate $[H^+(aq)]$ of 5.0×10^{-5} M. Calculate pH, $[OH^-(aq)]$, and pOH.

$$pH = -\log[H^+(aq)]$$

$$pH = -\log[H_3O^+]$$

$$pOH = -\log[OH^-]$$

$$K_w = 1.0 \times 10^{-14} = [H^+(aq)][OH^-(aq)]$$

$$pH + pOH = 14$$

2. Calculate the following:

$$pH = pK_a + \text{Log} \frac{[\text{base}]}{[\text{acid}]}$$

$$pH = pK_a + \text{Log} \frac{\text{moles base}}{\text{moles acid}}$$

$$pK_a = -\text{Log}K_a$$

a) The pH of a buffer solution that is 0.400 M $HCHO_2$ and 0.300 M CHO_2^- . $K_a = 1.8 \times 10^{-4}$.

b) The pH of the resulting solution if 0.050 moles of HCl is added to 500.0 mL of the buffer solution in part a). Is the calculated pH consistent with what you would expect for a buffer solution? Explain.

Answer Set for CHEM 1105 TEST#5

1. $\text{pH} = 4.30$ $[\text{OH}^-(\text{aq})] = 2.0 \times 10^{-10} \text{ M}$, and $\text{pOH} = 9.70$

2.a) 3.62; b) 3.34, Since buffers only minimize changes in pH and cannot prevent the drop in pH on the addition of a strong acid, a pH drop of only 0.30 units is expected on the addition of HCl to the buffer.