

NAME _____

Panther ID _____

For problems involving calculations you must show your work for credit. Unless otherwise stated, you may assume solutions are aqueous solutions, and $T = 25. \text{ }^\circ\text{C}$.

1) Which of the following solutions is a buffer solution?

a) A solution with 0.0400 M hypochlorous acid (HOCl) and 0.0500 M sodium hypochlorite (NaOCl)

b) A solution with 0.0400 M hypochlorous acid (HOCl) and 0.0500 M sodium hydroxide (NaOH)

c) A solution with 0.0400 M hypochlorous acid (HOCl) and 0.0500 M sodium chloride (NaCl)

d) Both a and b

e) Both a and b and c

2) A solution has 0.0600 M iodoacetic acid (CH_2ICOOH) and 0.0200 M sodium iodoacetate (NaCH_2ICOO). What is the pH of the solution? Note that $K_a(\text{CH}_2\text{ICOOH}) = 7.6 \times 10^{-4}$

3) A solution is formed by adding 0.0200 moles of potassium dihydrogen phosphate (KH_2PO_4) and 0.0250 moles of potassium hydrogen phosphate (K_2HPO_4) to water. The final volume of the solution is $V = 500.0 \text{ mL}$. What is the pH of the solution that forms? Note that for phosphoric acid (H_3PO_4) $K_{a1} = 7.5 \times 10^{-3}$, $K_{a2} = 6.2 \times 10^{-8}$, $K_{a3} = 4.8 \times 10^{-13}$

4) A 25.00 mL sample of a weak monoprotic acid solution is titrated with a 0.08274 M solution of potassium hydroxide (KOH).

a) The best choice for an indicator for the above titration would be (circle the correct answer)

bromophenol blue
 $pK_{\text{Ind}} = 3.8$

bromothymol blue
 $pK_{\text{Ind}} = 6.8$

cresol red
 $pK_{\text{Ind}} = 8.0$

b) After the addition of 29.88 mL of the KOH solution the end point of the titration is reached. Based on this, find the concentration of the stock solution of weak monoprotic acid.