

Quiz 4  
Chem 311  
Fall 2007

Name:

How many milliliters of a 6.02 M acetic acid solution must be added to 500.0 mL of a 0.0500 M solution of sodium acetate to prepare a buffer at a pH of 4.50.

$$K_a(\text{acetic acid}) = 1.75 \cdot 10^{-5}$$

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$$\text{p}K_a = -\log(1.75 \cdot 10^{-5}) = 4.757 \quad (2)$$

$$\text{mmoles of acetate ion} = (500.0 \text{ mL})(0.0500 \text{ M}) = 25.00 \text{ mmol}$$

$$\text{pH} = 4.50 = 4.757 + \log(25.00/x), \text{ where } x \text{ is the mmol of acetic acid required}$$

$$x = 45.175 \text{ mmol}$$

$$(45.175 \text{ mmol}) \cdot (1 \text{ mL} / 6.02 \text{ mmol}) = 7.5 \text{ mL}$$