
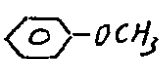


A. Problems: 60%

1. A 44.0 ml sample of 0.145 M HCl solution is titrated with 0.213 M NaOH. Calculate the pH of the solution after the addition of (a) 5.55 ml (b) 12.0 ml (c) 20.5 ml (d) 27.2 ml (e) 31.8 ml of NaOH solution.
2. Calculate the pH of the solution obtained by adding 20 ml of 0.10 M HAc to 20 ml of 0.10 M NaOH.  $K_a$  of HAc is  $1.75 \times 10^{-5}$
3. 40 ml, 0.01 M NaCl is titrated with 0.01 M  $AgNO_3$ . Calculate the pAg (a) when added 20 ml of  $AgNO_3$  (b) when added 40 ml of  $AgNO_3$   
 $K_{sp}$  of AgCl is  $10^{-10.0}$
4. Convert the following values of percentage transmittance,  $T\%$  to absorbance values: (a) 75% (b) 1.0%
5. Calculate  $[H^+]$  and pH of 0.10 M NaOAc, if  $K_a$  of HAc is  $1.75 \times 10^{-5}$ .
6. Calculate the pH of a solution prepared by adding 10 ml of 0.10 M HAc to 20 ml of 0.10 M NaOAc.  $K_a$  of HAc is  $1.75 \times 10^{-5}$ .

B. Questions: 40%

1. Indicate two types of indicators used in precipitation titration.
2. Compare the acidity of the following oxoacids:  $HClO$ ;  $HClO_2$ ;  $HClO_3$ ;  $HClO_4$
3. Define the acids and the bases according to (1) Brønsted-Lowry theory (2) Lewis theory.
4. Give the maximum and minimum values of  $R_f$ .
5. Which compound absorbs radiation at longer wavelength?  
(a)  $H-C \begin{matrix} H & H \\ | & | \end{matrix} = C \begin{matrix} H & H \\ | & | \end{matrix} - H$  or  $H-C \begin{matrix} H & H & H & H \\ | & | & | & | \end{matrix} = C \begin{matrix} H & H \\ | & | \end{matrix} - C \begin{matrix} H & H \\ | & | \end{matrix} - H$   
(b) -CH<sub>3</sub> or -OCH<sub>3</sub>
6. Compare  $\pi e^-$ ,  $n e^-$  and  $\sigma e^-$ , which will be excited easily by UV?
7. Give the resolution value which indicates two peaks just resolved.
8. Indicate two types of monochromator.