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 20ml of 0.10 M HOAc to 20ml of 0.10 M NaOH. K_a of HOAc is 1.75×10^{-5}

3. 40ml, 0.01 M NaCl is titrated with 0.01 M $AgNO_3$. Calculate the pAg (a) when added 20ml of $AgNO_3$ (b) when added 40ml 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 HOAc is 1.75×10^{-5}.

6. Calculate the pH of a solution prepared by adding 10ml of 0.10 M HOAc to 20ml of 0.10 M NaOAc. K_a of HOAc is 1.75×10^{-5}.

B. Questions : 40%

1. Indicate two types of indicators used in precipitation titration.

2. Compare the acidity of the following oxyacids: $HClO$; $HClO_2$; $HClO_3$; $HClO_4$

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) $H-\overset{H}{\underset{H}{C}}=\overset{H}{\underset{H}{C}}-H$ or $H-\overset{H}{\underset{H}{C}}=\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}=\overset{H}{\underset{H}{C}}-H$
(b)  or 

6. Compare πe^-, $n e^-$ and σe^-, which will be excited easily by UV?

7. Give the resolution value which indicates two peaks just resolved.

8. Indicate two types of monochromator.