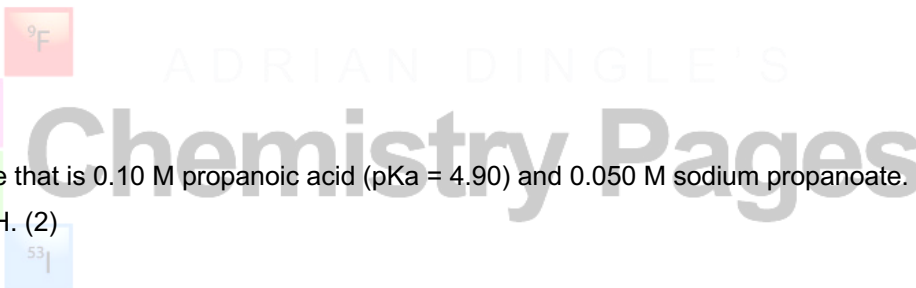
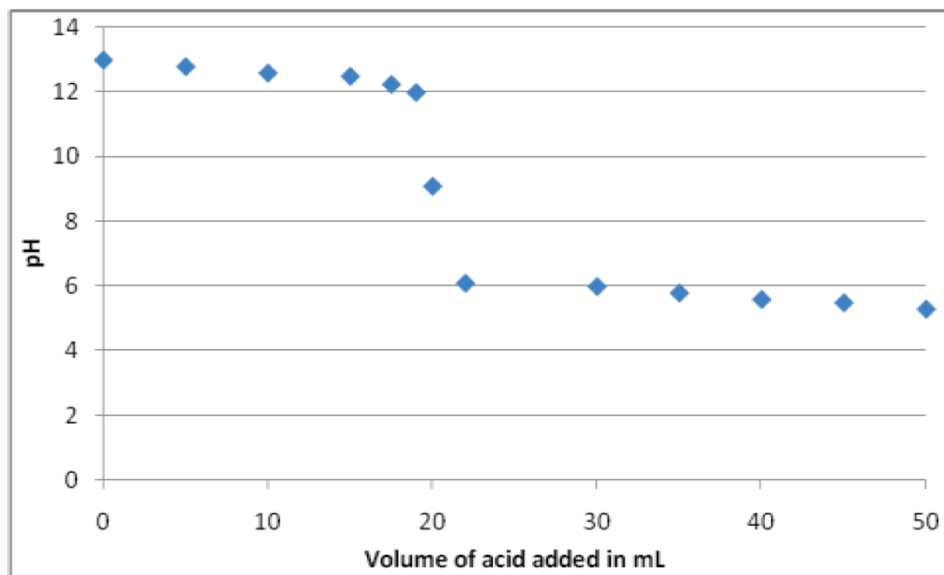


AP WORKSHEET 08ABCDEFGHIJ: Acids & Bases Summary

- Calculate the pH of the following;
 - HCl with a concentration of 0.200 M. (1)
 - Potassium hydroxide with a concentration of 0.0100 M. (1)
 - Benzoic acid with a concentration of 0.10 M (pK_a for benzoic acid = 4.20. Assume the degree of ionization of benzoic acid is negligible). (2)
- A buffer is made that is 0.10 M propanoic acid ($pK_a = 4.90$) and 0.050 M sodium propanoate. Calculate the pH. (2)
- A 0.10 M solution of a weak acid has a pH of 2.80. Calculate K_a and pK_a . (Assume the degree of ionization of the acid is negligible). (3)



4. The figure below shows the variation of pH on titrating 25.0 mL of 0.100 M NaOH with a monoprotic acid (one with only one hydrogen ion) HA. The reaction takes place in a 1:1 ratio.



- (a) Estimate the pH of the solution at the equivalence point and suggest a suitable indicator for the titration. (2)

ADRIAN DINGLE'S
Chemistry Pages

- (b) Is the acid strong or weak? Explain. (2)

- (c) What volume of acid is needed to neutralize all of the sodium hydroxide? (2)

- (d) Write an equation for the reaction taking place and hence calculate the molarity (concentration) of the acid. (4)

5. The ionic product of water, K_w at 298 K = 1×10^{-14} .

(a) Given the K_w of water at 50°C is 5.47×10^{-14} calculate the pH of water at this temperature. (3)

(b) From your answer to (a) and your knowledge of Le Châtelier's principle, suggest *and explain* whether the ionization of water is exothermic or endothermic. (2)



6. Consider the following reaction



- (a) Explain the role of $\text{C}_6\text{H}_5\text{NH}_2$ in the forward (left to right) reaction. (2)
- (b) Explain the significance of the \rightleftharpoons sign and what it means **in relation to your answer to (a)**. (2)
- (c) Comment on the role of water in the forward (left to right) reaction. (2)
- (d) Identify one acid/base conjugate pair. (1)

