Chapter 15 HW #1: Due 12/1/15 Complete both free response questions. One will be graded. Show al work. Box and clearly label all final answers $CH_3NH_2(aq) + H_2O(t) \implies CH_3NH_3^*(aq) + OH^*(aq) K_0 = 4.4 \times 10^{-4}$ Methylamine, CH <sub>3</sub> NH <sub>3</sub> , is a weak base that reacts with water according to the equation above. A student obtains a 500 mL sample of a methylamine solution and determines the pH of the solution to be 11.77.  (a) Write the expression for the equilibrium constant, $K_0$ , for methylamine concentration of OH in the 50.0 mL. sample of the methylamine solution before it reacted with water and equilibrium was established.  The 50.0 mL sample of the methylamine solution is titrated with an HCl solution of unknown concentration. The equivalence point of the titration is reached after a volume of 36 0 mL of the HCl solution is added. The pH of the solution at the equivalence point is 5.98.  (d) Write the net-ionic equation that represents the reaction that takes place during the titration.  (e) Calculate the concentration of the HCl solution used to titrate the methylamine.  (f) Calculate the concentration of the HCl solution used to titrate the methylamine.  (g) Calculate the concentration of the HCl solution of the titration of the titrat															
work. Box and clearly label all final answers $CH_3NH_2(aq) + H_2O(l) \rightleftharpoons CH_3NH_3^{\dagger}(aq) + OH^{\dagger}(aq) K_b = 4.4 \times 10^{-4}$ Methylamine, $CH_3NH_2$ , is a weak base that reacts with water according to the equation above. A student obtains a 50.0 mL sample of a methylamine solution and determines the pH of the solution to be 11.77.  (a) Write the expression for the equilibrium constant, $K_b$ , for methylamine.  (b) Calculate the molar concentration of $OH^{\dagger}$ in the 50.0 mL sample of the methylamine solution.  (c) Calculate the initial molar concentration of $CH_3NH_2(aq)$ in the solution before it reacted with water and equilibrium was established.  The 50.0 mL sample of the methylamine solution is titrated with an HCl solution of unknown concentration. The equivalence point of the titration is reached after a volume of 36.0 mL of the HCl solution is added. The pH of the solution at the equivalence point is 5.98.  (d) Write the net-ionic equation that represents the reaction that takes place during the titration.  (e) Calculate the concentration of the HCl solution used to titrate the methylamine.  (f) Using the axes provided, sketch the titration curve that results	Name		AP Chemi	stry											
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 $C_6H_5NH_2(aq) + H_2O(l) \rightleftharpoons C_6H_5NH_3^+(aq) + OH^-(aq)$ 

Aniline, a weak base, reacts with water according to the reaction represented above.

- (a) Write the equilibrium constant expression,  $K_b$ , for the reaction represented above.
- (b) A sample of aniline is dissolved in water to produce 25.0 mL of a 0.10 M solution. The pH of the solution is 8.82. Calculate the equilibrium constant,  $K_b$ , for this reaction.
- (c) The solution prepared in part (b) is titrated with 0.10 M HCl. Calculate the pH of the solution when 5.0 mL of the acid has been added.
- (d) Calculate the pH at the equivalence point of the titration in part (c).
- (e) The  $pK_a$  values for several indicators are given below. Which of the indicators listed is most suitable for this titration? Justify your answer.

Indicator	p <i>Ka</i>
Erythrosine	3
Litmus	7
Thymolphthalein	10
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