Name _____ Date _____ Period _____

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8.1 Introduction to Acids and Bases

AP Chemistry

Show your work. Use $K_w = 1.0 \times 10^{-14}$ at 25 °C unless told otherwise.

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1. Ammonia reacts with water: $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$

(a) In the forward reaction, which species is the Brønsted-Lowry acid and which is the base?

(b) Label the two conjugate acid-base pairs.

2. Water ionizes slightly. At 25 °C, $K_w = 1.0 \times 10^{-14}$. At 50 °C, $K_w = 5.5 \times 10^{-14}$.

(a) Write the equation for the autoionization of water and the K_w expression.

(b) Is the autoionization of water endothermic or exothermic? Use the K_w values to explain.

3. At 25 °C, a solution has $[H_3O^+] = 3.2 \times 10^{-4}\ M$. Find the pH, the pOH, and $[OH^-]$. Is the solution acidic, basic, or neutral?

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4. At 25 °C, a solution has a pH of 9.15. Find $[H_3O^+]$ and $[OH^-]$.

5. Pure water at 50 °C has $K_w = 5.5 \times 10^{-14}$.

(a) Calculate $[H_3O^+]$ and the pH of pure water at 50 °C.

(b) Is the water acidic, basic, or neutral? Explain.

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