Year 13 Science: Weak acids, bases, pH and buffers

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Write the Ka expression for HCOOH.

2. Calculate the pH of 0.050 mol L^{-1} HCOOH. Ka = 1.78×10^{-4}.

3. Calculate the pH of 0.20 mol L^{-1} NH_4Cl. Ka(NH_4^+) = 5.75×10^{-10}.

4. Which solution conducts better, 0.10 mol L^{-1} CH_3COOH or 0.10 mol L^{-1} CH_3COONa?

5. A buffer has [NH_3] = [NH_4^+] = 0.10 mol L^{-1}. What is its pH? pKa(NH_4^+) = 9.24.

Exam-style question: pool chlorine

Pools are disinfected with sodium hypochlorite, NaOCl. Hypochlorous acid, HOCl, is the better disinfectant. Ka(HOCl) = 2.95×10^{-8}, pKa = 7.53.

6. Write the Ka expression for HOCl.

7. Calculate the pH of 0.050 mol L^{-1} NaOCl.

8. List the species in 0.050 mol L^{-1} NaOCl, except water, in order of decreasing concentration.

9. A pool is kept at pH 7.50. Calculate the ratio [OCl^-] ÷ [HOCl], and say which is present in the greater amount.

10. Compare the conductivity of 0.050 mol L^{-1} NaOCl and 0.050 mol L^{-1} HOCl.

Fix the mistake

11. Correct this statement: "For 0.10 mol L^{-1} CH_3COOH, [H_3O^+] = 0.10 mol L^{-1}, so the pH is 1.00."

12. Correct this statement: "NH_4Cl is a salt, so its solution has pH 7."

13. Correct this statement: "A buffer keeps the pH exactly constant whatever is added."

14. Correct this statement: "A weak acid conducts poorly because it is dilute."