This quiz is take-home and open book, and it is intended that all members of the group contribute to completing it. It is a violation of the Academic Honor Code to sign a quiz that you did not work on. The quiz is due at the end of class on Thursday, March 25.

List names in alphabetical order, and give social security numbers! Put names on all pages, and staple pages together

Points

(3) 1. For solutions with the following \([H^+]\), calculate the \([OH^-]\), the pH, and indicate whether the solution is **acidic** or **basic**.

   (a) \([H^+] = 5.7 \times 10^{-2}\)

   (b) \([H^+] = 3.9 \times 10^{-8}\)

(3) 2. For solutions at the following pH, calculate the \([H^+]\) and \([OH^-]\). Indicate if the solution is **acidic** or **basic**.

   (a) pH = 4.2

   (b) pH = 12.3
(6) 3. You dissolve 0.075 moles of sulfuric acid (H$_2$SO$_4$) in 0.75 L of water.

(a) What would be the pH if the sulfuric acid completely dissociated into two hydrogen ions and a sulfate ion? (Write the equation for this hypothetical reaction).

(b) You measure the pH of the solution and, to your surprise, it measures 0.96. What is the actual [H$^+$] in the solution?

(c) How would you explain the discrepancy between your calculation in (a) and your measurement in (b)? Write an equation that more closely describes the actual reaction.

(3) 4. Sodium bicarbonate can be used to neutralize acid spills. Equation 6.29, page 207, describes this reaction. If you spilled on the floor 25 mL of 0.20 M hydrochloric acid (HCl), how many grams of sodium bicarbonate would you need to use to neutralize the spill?