

Practice for using the ICE approach.

1) Nitrogen gas reacts with oxygen gas to form dinitrogen pentoxide gas. Write down the balanced equation, making all coefficients integers. Write down the  $K_c$ ,  $K_p$  expressions. If  $K_c = 1.20 \times 10^1$  but note that  $K_c$  here is given per mole of  $N_2$  reacted, what is the  $K_c$  for your balanced equation? What is  $K_p$  at  $25^\circ\text{C}$  for your balanced equation?

2) Copper(II) hydroxide is a sparingly soluble solid with a  $K_{sp}$  of  $1.6 \times 10^{-19}$ .

a) What is the molar solubility of this compound?

b) Assuming that the hydroxide ions in solution are only from the dissolution of this compound, what is the value of  $[\text{OH}^-]$ ?

3) The acid ionization constant of cyanic acid (HOCN) is  $3.5 \times 10^{-4}$ . What is  $[\text{H}^+]$  due to the self-ionization of this acid if we dissolve 0.100 moles HOCN to make 1.0 L of solution? First, use (a) the 5% rule. Compare and see if the 5% rule is valid. If not, re-solve the problem using the quadratic equation.

4) The decomposition of sulfur trioxide gas to oxygen gas and sulfur dioxide gas has a  $K_c$  of  $4.10 \times 10^{-6}$ . What are the concentrations of all the gases if we initially have 0.500 M of  $\text{SO}_3$  gas in an air-tight container?