Primary Topics of Equilibrium Part 2 Assignment

Watch the following video podcasts and answer each question below:

Primary Topics of Equilibrium Part 2: https://www.youtube.com/watch?v=IQ4ZGYWU2zE

- 1) Determine the expression for the equilibrium constant, Kb, for a weak acid like NH₃.
 - $(A) Kb = [OH^{-}] [NH_4^{+}] / [NH_3] [H_2O]$
 - (B) $Kb = [OH^{-}][NH_4^{+}]/[NH_3]$
 - (C) $Kb = [NH_3] [H_2O] / [OH^-] [NH_4^+]$
 - (D) $Kb = [NH_3] / [OH^-] [NH_4^+]$
 - (E) $Kb = [NH_3]$
- 2) Calculate the molar concentration of a 0.30 M solution of acetic acid, $HC_2H_3O_2$, given the chemical reaction below. Ka for acetic acid is 1.8×10^{-5} .

$$HC_2O_3O_2$$
 (aq) + H_2O (l) \leftrightarrow H_3O^+ (aq) + $C_2H_3O_2^-$ (aq)

- (A) 0.0010 M
- (B) 0.0023 M
- (C) 0.0052 M
- (D) 0.15 M
- (E) 0.30 M
- 3) Calculate the concentration, in mol L⁻¹, of IO_4^- (aq) in a saturated solution of $Cu(IO_4)_2$ given the $Ksp = 1.40 \times 10^{-7}$ according to the following reaction.

$$Cu(IO_4)_2$$
 (s) \leftrightarrow Cu^{2+} (aq) + 2 IO_4^- (aq)

- (A) 0.00132 *M*
- (B) 0.00327 M
- (C) 0.00654 M
- (D) 0.0131 M
- (E) 0.0262 M
- 4) Given $0.10 M \text{ COCl}_2$, what is the equilibrium concentration of CO given $\text{Kc} = 2.19 \times 10^{-10}$ according to the following chemical reaction.

$$COCl_{2}\left(g\right) \leftrightarrow CO\left(g\right) +Cl_{2}\left(g\right)$$

- $(A) 4.68 \times 10^{-6} M$
- (B) $9.36 \times 10^{-6} M$
- (C) $1.87 \times 10^{-5} M$
- (D) $3.74 \times 10^{-5} M$
- (E) $7.48 \times 10^{-5} M$

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5) The reaction below has an equilibrium constant $Ksp = 7.1 \times 10^{-4}$. Calculate the equilibrium concentration of Ca^{2+} (aq).

$$CaCrO_4(s) \leftrightarrow Ca^{2+}(aq) + CrO_4^{2-}(aq)$$

- (A) 0.00036 M
- (B) 0.00071 M
- (C) 0.013 M
- (D) 0.027 M
- (E) 0.054 M