

Equilibrium Practice Problems

1. Write the equilibrium expression for each of the following reactions:



$$K = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$$



$$K = \frac{[\text{ICl}]^2}{[\text{Cl}_2]}$$



$$K = \frac{[\text{NO}][\text{O}_2]^{1/2}}{[\text{NO}_2]}$$

2. The dissociation of acetic acid, CH_3COOH , has an equilibrium constant at 25°C of 1.8×10^{-5} . The reaction is



If the equilibrium concentration of CH_3COOH is 0.46 moles in 0.500 L of water and that of CH_3COO^- is 8.1×10^{-3} moles in the same 0.500 L, calculate $[\text{H}^+]$ for the reaction.

$$K = \frac{[\text{CH}_3\text{COO}^-][\text{H}^+]}{[\text{CH}_3\text{COOH}]} \quad \text{Plug in known values and solve.}$$

$$1.8 \times 10^{-5} = \frac{[8.1 \times 10^{-3} \text{ moles/0.500 L}][\text{H}^+]}{[0.46 \text{ moles/0.500 L}]}$$

$$[\text{H}^+] = 1.0 \times 10^{-3} \text{ M}$$

3. Indicate the effect of a catalyst, pressure, temperature and concentration on each of the following on:

	catalyst	pressure	temperature	concentration
a. speed	presence increase	direct relationship	direct relationship	direct relationship
b. pos ⁿ	nothing	based on moles	based on enthalpy of rxn	inverse relationship

18 Reaction Rates And Equilibrium Practice Problems

Darrell D. Ebbing

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