Name _____ Date _____ Period _____

ZornScience zornscience.org

7.3 Reaction Quotient and Equilibrium Constant

AP Chemistry

Products over reactants, coefficients become exponents. Leave out (s) and (l). Q describes any mixture; at equilibrium Q = K.

1. Write the K_c expression for each reaction.

(a) $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$

(b) $CH_4(g) + H_2O(g) \rightleftharpoons CO(g) + 3H_2(g)$

(c) $Fe_3O_4(s) + 4H_2(g) \rightleftharpoons 3Fe(s) + 4H_2O(g)$

(d) $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$

2. Write the K_p expression for $2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$.

3. Write K_c for $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$. Does adding more $CaCO_3(s)$ change K?

CC BY-NC-SA 4.0 | zornscience.org

4. For $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, a flask holds 0.150 M H_2, 0.200 M I_2, and 0.300 M HI. Calculate Q_c.

5. K_c for the reaction in question 4 is 49.0. Is the mixture at equilibrium? How do you know?

6. A student writes $K_c = [CO][3H_2] / [CH_4][H_2O]$ for question 1(b). Find and fix the mistake.

7. Q for a reaction is very large compared with K. Does the mixture have too many products or too many reactants?

CC BY-NC-SA 4.0 | zornscience.org