Chemical equilibriums

$$A\ (aq) + B\ (aq) \leftrightarrow 2C\ (aq) + D\ (s) + \text{heat}$$

1 What is the equilibrium expression (or equation) for the above reversible rxn?

$$K_c = \frac{[\text{Products}]^{\text{coeff}}}{[\text{Reactants}]^{\text{coeff}}}$$

2. If the rate law constant for the forward rxn is 6.8 @ 100 C and the rate law constant for the reverse rxn is 1.5 @ 100 C, what is the equilibrium constant?

$K_c = kf/kr$

3. If the above rxn is reversed so that 2C (aq) + D (s) <--> A(aq) + B (aq), what would thevalue of the equilibrium constant be at the same temperature (100 C)?

$Kc = 1/Kc$

4. At 100 C, what is favored at equilibrium, the reactants or products? (Refer to the original rxn written at the top of the page)

Kc > 1 products are favored (meaning more are present at equilbrium)
Kc < 1 reactants are favored

5. If @ 100 C the following concentrations of reactants and products were obtained, how can you tell if the rxn has reached a state of equilibrium?

Q (reaction quotient) = Keq the rxn has reached equilibrium
Q < Keq the rxn has too much reactant and is shifting to create more product
Q > Keq the rxn has too much product and will shift to create more reactant

6. If the initial (A) = 2.0 Molar , and (B) is 3.0 Molar, what will the equilibrium concentration be for the product C?

$$Kc = \frac{[C]^2}{[A][B]}$$

Gas equilibriums.

heat + A (g) + B (g) <--> C (g)

6. What is the Kc expression for the above reversible rxn?What is its unit?

7. What is the Kp expression for the above rxn?

8. If at 50 C the equilibrium constant, Keq or Kc, is equal to 0.055 , what would the value of Kp be?

$Kp = Kc\ (RT)^{\Delta n}$

9. What is favored at equilibrium, the reactants or products (look at Kc from Q#8) ? How can you tell?

10. If @ **equilibrium** the partial pressure of C is 2.0 atm, and the partial pressure of B is 6.9 atm, what would the partial pressure of A be? Kp =? (From Q # 8)

11. What would the total pressure of all the gases be when the system has reached a state of equilibrium?

12 If the reaction vessel was a 2.5 liter container, how many total moles are present inside the container? PV=nRT

13. By increasing the temperature, what will happen to the value of Kc ?

14. By increasing the pressure, what will happen to the value of Kp?

15. If you know the rxn and you know what you start with and end with, you can calculate the the value of the Kc/Kp.

If a reaction chamber has an initial concentration of 24 moles of A in a 3.0 Liter container and when it reaches equilibrium is only has 6.0 moles of A, what is the value of the equilibrium constant?

	A ←→ 3D	Kc = $\frac{[D]^3}{[A]}$
[Initial Conc.]	8.0 M 0	
[Change in Conc]	_____	
[Final @ Eq]	2.0 M	Find Kc =?

16. If you know the rxn and the constant, and you are given the initial amount, you can figure out the concentrations/amounts present when it eventually reaches equilibrium. A rxn vessel is charged with 1.2 atm of A. What will the partial pressure of A, C, and D be when it reaches equilibrium if the Kp constant is 3.0?

	A ←→ C + D	Kp= $\frac{P_c \times P_d}{P_a}$
Initial P	1.2 atm 0 0	
Change in P	_____	
Final P @ Eq		