**Quiz 1**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Consider the reaction xenon and fluorine gases to produced xenon tetrafluoride gas. A reaction mixture initially contains 2.24 atm xenon and 4.27 atm fluorine gases (10 points).
	1. If the equilibrium pressure of xenon is 0.34 atm, find the equilibrium constant, Kp, for the reaction.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Xe (g) | + |  2 F2 (g)  | $$⇌$$ | XeF4 (g) |
| I | 2.24 atm |  | 4.27 atm |  | 0 atm |
| C | -x |  | -2x |  | +x |
| E | 2.24 atm – x = 0.34 atmx = 1.90 atm  |  | 4.27 atm – 2 x =4.27 atm – 2(1.90 atm) =0.47 atm |  | 1.90 atm |

$$K\_{p}=\frac{[XeF\_{4}]}{\left[Xe\right][F\_{2}]^{2}}=\frac{(1.90 atm)}{\left(0.34 atm\right)(0.47 atm)^{2}}=25\frac{1}{atm^{2}}$$

* 1. What is the value of the equilibrium constant, Kc, if the reaction takes place at 215 °C?

$$K\_{p}=K\_{c}(RT)^{∆n}⇒K\_{c}=K\_{p}(RT)^{-∆n}$$

$$K\_{c}=(25\frac{1}{atm^{2 }})[\left(0.08206 \frac{L atm}{mol K}\right)\left(215+273\right)]^{-\left(1-1-2\right)}=4.0×10^{4}\frac{L}{mol atm}$$

1. Dilute exactly 5 mL of 1.2 M acetic acid to 25 mL. What is the new concentration of the acetic acid (4 points)?

$$M\_{1}V\_{1}=M\_{2}V\_{2}⇒M\_{2}=\frac{M\_{1}V\_{1}}{V\_{2}}=\frac{(1.2 M)(5 mL)}{(25 mL)}=0.24 M=0.2 M $$

1. Calculate K for the reaction (6 points) :

SnO2 (s) + 2 CO (g) $⇌$ Sn (s) + 2 CO2 (g) K = ?

given the following information:

SnO2 (s) + 2 H2 (g) $⇌$ Sn (s) + 2 H2O (g) K1 = 8.12

H2 (g) + CO2 (g) $⇌$ H2O (g) + CO (g) K2 = 0.771 flip and multiply by 2, so K2’ = (1/K2)2

SnO2 (s) + 2 H2 (g) $⇌$ Sn (s) + 2 H2O (g) K1 = 8.12

2 H2O (g) + 2 CO (g) $⇌$ 2 H2 (g) + 2 CO2 (g) K2’ = 1.68

SnO2 (s) + 2 CO (g) $⇌$ Sn (s) + 2 CO2 (g) K = K1 × K2’ = 8.12 × 1.68 = 13.7