SID ☐☐☐☐☐☐☐   Last _____   First _____

Question 1 2 Points	The reaction between ammonia and nitrous oxide is given below:

Question 1
2 Points

The reaction between ammonia and nitrous oxide is given below:

$$2\ NH_3(g) + 3\ N_2O(g) \longrightarrow 4\ N_2(g) + 3\ H_2O(g)$$

We therefore know that **which of the following reactions can also occur?**

☐ $4\ NH_3(g) + 6\ NO(g) \longrightarrow 8\ N_2(g) + 6\ H_2O(l)$

☐ $4\ N_2(g) + 3\ H_2O(g) \longrightarrow 2\ NH_3(g) + 3\ N_2O(g)$

☐ $5\ N_2(g) + 6\ H_2O(l) \longrightarrow 4\ NH_3(g) + 6\ NO(g)$

☐ $NH_3(g) + 3/2\ N_2O(g) \longrightarrow 2N_2(g) + 3/2\ H_2O(g)$

Question 2
4 Points

Consider the following reaction where **Kc = 0.159** at 723 K:

$$N_2(g) + 3\ H_2(g) \rightleftharpoons 2\ NH_3(g)$$
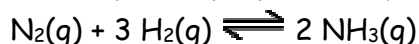
A reaction mixture was found to contain **4.11×10⁻² moles** of $N_2(g)$, **3.99×10⁻²** moles of **$H_2(g)$** and **5.64×10⁻⁴** moles of **$NH_3(g)$**, in a **1.00 Liter** container.

Indicate **True (T)** or **False (F)** for each of the following:

a)   In order to reach equilibrium **$NH_3(g)$** must be **produced**.   _____

b)   In order to reach equilibrium **K_c** must **decrease**.   _____

c)   In order to reach equilibrium **$N_2(g)$** must be **consumed**.   _____

d)   **Q** is **less** than **K**.   _____
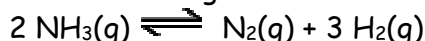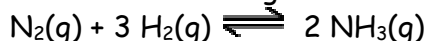

Question 3
2 Points

Consider the following equilibrium: $NH_4I(s) \rightleftharpoons NH_3(g) + HI(g)$

Circle the statement that is correct with respect to Kc and Kp for this equilibrium.

☐   **$K_c = K_p$**   ☐   **$K_c > K_p$**   ☐   **$K_c < K_p$**

Question 4
2 Points

The equilibrium constant, **K_c**, for the following reaction is **2.76** at 698 K.

$$2\ NH_3(g) \rightleftharpoons N_2(g) + 3\ H_2(g)$$

Calculate K_p at this temperature for the following reaction:

$$N_2(g) + 3\ H_2(g) \rightleftharpoons 2\ NH_3(g)$$

R = 0.0821 L.atm.mol⁻¹.K⁻¹

$K_p = $ _____