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Last KeyFirst Answer

## Question 1

2 Points

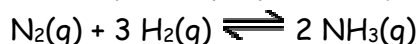
The reaction between ammonia and nitrous oxide is given below:

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

- $4 \text{NH}_3(\text{g}) + 6 \text{NO}(\text{g}) \longrightarrow 8 \text{N}_2(\text{g}) + 6 \text{H}_2\text{O}(\text{l})$   
  $4 \text{N}_2(\text{g}) + 3 \text{H}_2\text{O}(\text{g}) \longrightarrow 2 \text{NH}_3(\text{g}) + 3 \text{N}_2\text{O}(\text{g})$   
  $5 \text{N}_2(\text{g}) + 6 \text{H}_2\text{O}(\text{l}) \longrightarrow 4 \text{NH}_3(\text{g}) + 6 \text{NO}(\text{g})$   
  $\text{NH}_3(\text{g}) + 3/2 \text{N}_2\text{O}(\text{g}) \longrightarrow 2\text{N}_2(\text{g}) + 3/2 \text{H}_2\text{O}(\text{g})$

## Question 2

4 Points

Consider the following reaction where  $K_c = 0.159$  at 723 K:A reaction mixture was found to contain  $4.11 \times 10^{-2}$  moles of  $\text{N}_2(\text{g})$ ,  $3.99 \times 10^{-2}$  moles of  $\text{H}_2(\text{g})$  and  $5.64 \times 10^{-4}$  moles of  $\text{NH}_3(\text{g})$ , in a 1.00 Liter container.

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

- a) In order to reach equilibrium  $\text{NH}_3(\text{g})$  must be **produced**.  
b) In order to reach equilibrium  $K_c$  must **decrease**.  
c) In order to reach equilibrium  $\text{N}_2(\text{g})$  must be **consumed**.  
d)  $Q$  is less than  $K$ .

T  
F  
T  
T

## Question 3

2 Points

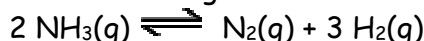
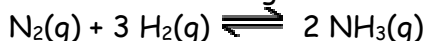
Consider the following equilibrium:

**Circle the statement that is correct** with respect to  $K_c$  and  $K_p$  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.Calculate  $K_p$  at this temperature for the following reaction:

$$R = 0.0821 \text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}$$

$$K_p = K_c (RT)^{\Delta n}$$

$$\begin{aligned}
K_p &= 0.362 (RT)^{2-4} \\
&= 0.362 (RT)^{-2} \\
&= \frac{0.362}{(0.0821 \times 698)^2} \\
&= 1.10 \times 10^{-4}
\end{aligned}$$

$$\begin{aligned}
K_c &= \frac{1}{2.76} \\
&= 0.362
\end{aligned}$$

$$K_p = \underline{1.10 \times 10^{-4}}$$