Chapter 9 - Lecture Worksheet 5

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1. Consider the following system at equilibrium where ΔH^o = **-111** kJ, and K_c = **0.159**, at **723** K:

$$\mathbf{N_2}(g) + \mathbf{3\ H_2}(g) \ \text{<-----> } \mathbf{2\ NH_3}\ (g)$$

If the **volume** of the equilibrium system is suddenly decreased at constant temperature:

A. The value of Kc 1. Increases 2. Decreases 3. Remains the same

B. The value of Q 1. Is greater than K 2. Is equal to K 3. Is less than K

C. The reaction must:

1. Run in the forward direction to restablish equilibrium.
2. Run in the reverse direction to restablish equilibrium.
3. Remain the same. Already at equilibrium.

D. The number of moles of H_2 will: 1. Increase 2. Decrease 3. Remain the same.

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2. K_p for the following reaction is 0.16 at 25^0C. The enthalpy change for the reaction at standard conditions is 16.1 kJ. Predict the effect of the following changes on the direction the reaction must move in order to reestablish equilibrium: **PRS Answers: 1. Left 2. Right 3. No change**

$2\ NOBr(g) \text{ <------> } 2\ NO(g) + Br_2(g)$

A. Add more $Br_2(g)$

B. Remove some NOBr(g)

C. Decrease the temperature

D. Increase the volume of the container.

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3. Consider the following system at equilibrium where ΔH^o = **-111** kJ, and K_c = **0.159**, at **723** K:
$\mathbf{N_2}(g) + \mathbf{3\ H_2}(g) \text{ <-----> } \mathbf{2\ NH_3}\ (g)$

If the TEMPERATURE of the equilibrium system is suddenly decreased:

A. The value of Kc 1. Increases 2. Decreases 3. Remains the same

B. The value of Q 1. Is greater than K 2. Is equal to K 3. Is less than K

C. The reaction must:

1. Run in the forward direction to restablish equilibrium.
2. Run in the reverse direction to restablish equilibrium.
3. Remain the same. Already at equilibrium.

D. The concentration of H_2 will: 1. Increase 2. Decrease 3. Remain the same

4. If you want to MAXIMIZE the production of ammonia you should:			
1. Run at high temperature	3. Run at high pressure	5. Add H_2 and N_2	7. Add NH_3
2. Run at low temperature	4. Run at low pressure	6. Remove H_2 and N_2	8. Remove NH_3