# LeChatelier's Principle

# Apprentice Difficulty Level Question Group 1 Question 1

The following reversible system is at equilibrium:

 $CO_{(g)} \hspace{.1in} + \hspace{.1in} H_2O_{(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} H_{2(g)} \hspace{.1in} + \hspace{.1in} CO_{2(g)}$ 

If additional carbon monoxide (CO) is added to the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

### **Question 2**

The following reversible system is at equilibrium:

 $2 \hspace{.1cm} SO_{3} \hspace{.1cm} {}_{(g)} \hspace{.1cm} \longleftrightarrow \hspace{.1cm} 2 \hspace{.1cm} SO_{2} \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} O_{2} \hspace{.1cm} {}_{(g)}$ 

If additional sulfur trioxide  $(SO_3)$  is added to the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 3**

The following reversible system is at equilibrium:

 $PCI_{5\,(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} PCI_{3\,(g)} \hspace{.1in} + \hspace{.1in} CI_{2\,(g)}$ 

If additional phosphorus pentachloride (PCI<sub>5</sub>) is added to the system, then the equilibrium position would

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

Question Group 2 Question 4 The following reversible system is at equilibrium:

 $CO_{(g)}$  +  $H_2O_{(g)}$   $\leftrightarrow$   $H_{2(g)}$  +  $CO_{2(g)}$ 

If some carbon monoxide (CO) is removed from the system, then the equilibrium position would \_\_\_\_\_. not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

### **Question 5**

The following reversible system is at equilibrium:

 $2 \hspace{.1cm} SO_{3 \hspace{.1cm} (g)} \hspace{.1cm} \leftrightarrow \hspace{.1cm} 2 \hspace{.1cm} SO_{2 \hspace{.1cm} (g)} \hspace{.1cm} + \hspace{.1cm} O_{2 \hspace{.1cm} (g)}$ 

If some sulfur trioxide  $(SO_3)$  is removed from the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 6**

The following reversible system is at equilibrium:

 $PCI_{5 (g)} \quad \longleftrightarrow \quad PCI_{3 (g)} \quad + \quad CI_{2 (g)}$ 

If some phosphorus pentachloride (PCI<sub>5</sub>) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

#### **Question Group 3 Question 7** The following reversible system is at equilibrium:

 $CO_{(g)} \hspace{.1in} + \hspace{.1in} H_2O_{(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} H_{2\,(g)} \hspace{.1in} + \hspace{.1in} CO_{2\,(g)}$ 

If additional carbon dioxide (CO<sub>2</sub>) is added to the system, then the equilibrium position would \_\_\_\_\_\_. not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 8**

The following reversible system is at equilibrium:

 $2 \hspace{.1cm} SO_{3} \hspace{.1cm} {}_{(g)} \hspace{.1cm} \longleftrightarrow \hspace{.1cm} 2 \hspace{.1cm} SO_{2} \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} O_{2} \hspace{.1cm} {}_{(g)}$ 

If additional sulfur dioxide  $(SO_2)$  is added to the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 9**

The following reversible system is at equilibrium:

 $PCI_{5 (g)} \quad \longleftrightarrow \quad PCI_{3 (g)} \quad + \quad CI_{2 (g)}$ 

If additional phosphorus trichloride (PCI<sub>3</sub>) is added to the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### Question Group 4 Question 10

The following reversible system is at equilibrium:

 $CO_{(g)} \hspace{.1in} + \hspace{.1in} H_2O_{(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} H_{2\,(g)} \hspace{.1in} + \hspace{.1in} CO_{2\,(g)}$ 

If some carbon dioxide (CO<sub>2</sub>) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

The following reversible system is at equilibrium:

 $2 \text{ SO}_{3 \text{ (g)}} \leftrightarrow 2 \text{ SO}_{2 \text{ (g)}} + \text{ O}_{2 \text{ (g)}}$ 

If some sulfur dioxide (SO<sub>2</sub>) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 12**

The following reversible system is at equilibrium:

 $PCI_{5\,(g)} \hspace{.1in} \longleftrightarrow \hspace{.1in} PCI_{3\,(g)} \hspace{.1in} + \hspace{.1in} CI_{2\,(g)}$ 

If some phosphorus trichloride (PCl<sub>3</sub>) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### Master Difficulty Level Question Group 5 Question 13 The following reversible system is at equil

The following reversible system is at equilibrium:

 $C_{(s)}$  +  $CO_{2(g)}$   $\leftrightarrow$  2  $CO_{(g)}$ 

If additional carbon dioxide (CO<sub>2</sub>) is added to the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

The following reversible system is at equilibrium:

 $C_{(s)}$  +  $CO_{2(g)}$   $\leftrightarrow$  2  $CO_{(g)}$ 

If additional carbon monoxide (CO) is added to the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

### **Question 15**

The following reversible system is at equilibrium:

 $C_{(s)}$  +  $CO_{2(g)}$   $\leftrightarrow$  2  $CO_{(g)}$ 

If some carbon monoxide (CO) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change

shift to the right in the direction of products

shift to the left in the direction of reactants

# Question Group 6 Question 16

The following reversible system is at equilibrium:

 $2 \ H_2O \ {}_{(l)} \quad \leftrightarrow \quad 2 \ H_2 {}_{(g)} \quad + \quad O_2 {}_{(g)}$ 

If additional hydrogen (H<sub>2</sub>) is added to the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 17**

The following reversible system is at equilibrium:

 $2 \ H_2O \ {}_{(l)} \quad \leftrightarrow \quad 2 \ H_2 \, {}_{(g)} \quad + \quad O_2 \, {}_{(g)}$ 

If additional oxygen (O<sub>2</sub>) is added to the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 18**

The following reversible system is at equilibrium:

 $2 \ H_2O \ {}_{(l)} \quad \leftrightarrow \quad 2 \ H_2 \, {}_{(g)} \quad + \quad O_2 \, {}_{(g)}$ 

If some hydrogen (H<sub>2</sub>) is removed from the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# Question Group 7 Question 19

The following reversible system is at equilibrium:

 $P_{4 \ (s)} \hspace{.1in} + \hspace{.1in} 6 \hspace{.1in} Cl_{2 \ (g)} \hspace{.1in} \leftrightarrow \hspace{.1in} 4 \hspace{.1in} PCl_{3 \ (l)}$ 

If additional phosphorus (P4) is added to the system, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# Question 20

The following reversible system is at equilibrium:

 $P_{4\;(s)} \hspace{.1in} \textbf{+} \hspace{.1in} 6\; Cl_{2\;(g)} \hspace{.1in} \longleftrightarrow \hspace{.1in} 4\; PCl_{3\;(l)}$ 

If additional phosphorus trichloride (PCI<sub>3</sub>) is added to the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products

shift to the left in the direction of reactants

The following reversible system is at equilibrium:

 $P_{4\;(s)} \hspace{.1in} \textbf{+} \hspace{.1in} 6\;Cl_{2\;(g)} \hspace{.1in} \longleftrightarrow \hspace{.1in} 4\;PCl_{3\;(l)}$ 

If some phosphorus ( $P_4$ ) is removed from the system, then the equilibrium position would \_\_\_\_\_.

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# Question Group 8 Question 22

The following reversible system is at equilibrium:

 $N_{2\,(g)} \hspace{.1in} \textbf{+} \hspace{.1in} \textbf{3} \hspace{.1in} H_{2\,(g)} \hspace{.1in} \longleftrightarrow \hspace{.1in} \textbf{2} \hspace{.1in} NH_{3}\,_{(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### **Question 23**

The following reversible system is at equilibrium:

 $N_2O_{4(g)} \leftrightarrow 2 NO_{2(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 24**

The following reversible system is at equilibrium:

 $4 \hspace{.1cm} NO_2 \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} 6 \hspace{.1cm} H_2O \hspace{.1cm} {}_{(g)} \hspace{.1cm} \leftrightarrow \hspace{.1cm} 4 \hspace{.1cm} NH_3 \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} 7 \hspace{.1cm} O_2 \hspace{.1cm} {}_{(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# Question Group 9 Question 25

The following reversible system is at equilibrium:

 $N_{2\,(g)} \hspace{.1in} + \hspace{.1in} 3 \hspace{.1in} H_{2\,(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} 2 \hspace{.1in} NH_{3\,(g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 26**

The following reversible system is at equilibrium:

 $2 \text{ NO}_{2 (g)} \leftrightarrow \text{N}_{2}\text{O}_{4 (g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### **Question 27**

The following reversible system is at equilibrium:

 $4 \text{ NO}_{2 (g)} + 6 \text{ H}_{2} O_{(g)} \leftrightarrow 4 \text{ NH}_{3 (g)} + 7 O_{2 (g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# Question Group 10 Question 28

The following reversible system is at equilibrium:

 $CO_{(g)} \hspace{.1in} + \hspace{.1in} H_2O_{(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} H_2_{(g)} \hspace{.1in} + \hspace{.1in} CO_2_{(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

### **Question 29**

The following reversible system is at equilibrium:

 $H_{2\,(g)} \hspace{.1in} + \hspace{.1in} F_{2\,(g)} \hspace{.1in} \leftrightarrow \hspace{.1in} 2 \hspace{.1in} HF_{\,(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 30**

The following reversible system is at equilibrium:

 $NO_{(g)} + O_{3}_{(g)} \leftrightarrow NO_{2}_{(g)} + O_{2}_{(g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

### Question Group 11 Question 31

The following reversible system is at equilibrium:

 $\begin{array}{rrrr} N_{2\,(g)} & + & 3 \ H_{2\,(g)} & \longleftrightarrow & 2 \ NH_{3\,(g)} \\ & & \Delta H = -92 \ kJ \end{array}$ 

If the temperature of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 32**

The following reversible system is at equilibrium:

$$\begin{array}{rcl} N_2O_{4\,(g)} & \leftrightarrow & 2 \ NO_{2\,(g)} \\ \Delta H = +58 \ kJ \end{array}$$

If the temperature of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### **Question 33**

The following reversible system is at equilibrium:

If the temperature of the system were increased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

#### Question Group 12 Question 34 The following reversible system is at equilibrium:

$$\begin{array}{rrrr} N_{2\,(g)} & + & 3 \ H_{2\,(g)} & \leftrightarrow & 2 \ NH_{3\,(g)} \\ & & \Delta H = -92 \ kJ \end{array}$$

If the temperature of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

### **Question 35**

The following reversible system is at equilibrium:

$$\begin{array}{rcl} N_2O_{4\,(g)} & \longleftrightarrow & 2 \ NO_{2\,(g)} \\ \Delta H = +58 \ kJ \end{array}$$

If the temperature of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

# **Question 36**

The following reversible system is at equilibrium:

If the temperature of the system were decreased, then the equilibrium position would

not be affected by such a change shift to the right in the direction of products shift to the left in the direction of reactants

Wizard Difficulty Level

**Question Group 13** Question 37 The following reversible system is at equilibrium:  $2 \text{ NO}_{(q)} + \text{Cl}_{2(q)} \leftrightarrow 2 \text{ NOCl}_{(q)}$ If additional Cl<sub>2</sub> were added to the system, then the equilibrium position would \_\_\_\_\_. b. shift to the left c. not shift at all a. shift to the right This result is that the amount of NO would \_\_\_\_\_ ... c. remain unchanged a. increase b. decrease ... and the amount of NOCI would \_\_\_\_\_. c. remain unchanged b. decrease a. increase Question 38 The following reversible system is at equilibrium:  $PCI_{3(g)} + 3 NH_{3(g)} \leftrightarrow P(NH_2)_{3(g)} + 3 HCI_{(g)}$ If additional P(NH<sub>2</sub>)<sub>3</sub> were added to the system, then the equilibrium position would a. shift to the right b. shift to the left c. not shift at all This result is that the amount of NH<sub>3</sub> would \_\_\_\_\_ ... c. remain unchanged a. increase b. decrease ... and the amount of HCI would . c. remain unchanged a. increase b. decrease **Question 39** The following reversible system is at equilibrium:  $4 \text{ NH}_{3 (g)} + 7 \text{ O}_{2 (g)} \leftrightarrow 4 \text{ NO}_{2 (g)} + 6 \text{ H}_{2} \text{ O}_{(g)}$ If additional H<sub>2</sub>O were added to the system, then the equilibrium position would \_\_\_\_\_. c. not shift at all b. shift to the left a. shift to the right This result is that the amount of  $NH_3$  would \_\_\_\_\_\_ ... b. decrease c. remain unchanged a. increase

... and the amount of NO<sub>2</sub> would \_\_\_\_\_\_.

a. increase

b. decrease

#### Question Group 14 Question 40

The following reversible system is at equilibrium:

 $2 \text{ NO } (\text{g}) \quad + \quad Cl_2 \, (\text{g}) \quad \leftrightarrow \quad 2 \text{ NOCI } (\text{g})$ 

If some Cl <sub>2</sub> were removed from the system, then the equilibrium position would		
a. shift to the right	b. shift to the left	c. not shift at all
This result is that the amount a. increase	t of NO would b. decrease	c. remain unchanged
and the amount of NOCI w a. increase	ould b. decrease	c. remain unchanged
Question 41 The following reversible system is at equilibrium:		
$PCI_{3 \ (g)} \ \ + \ \ 3 \ NH_{3 \ (g)} \ \ \leftrightarrow \ \ P(NH_2)_{3 \ (g)} \ \ + \ \ 3 \ HCI_{(g)}$		
If some $P(NH_2)_3$ were removed from the system, then the equilibrium position would		
a. shift to the right	b. shift to the left	c. not shift at all
a. shift to the right This result is that the amount a. increase	b. shift to the left t of NH₃ would b. decrease	c. not shift at all c. remain unchanged

# Question 42

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The following reversible system is at equilibrium:

 $4 \text{ NH}_{3 \text{ (g)}} + 7 \text{ O}_{2 \text{ (g)}} \leftrightarrow 4 \text{ NO}_{2 \text{ (g)}} + 6 \text{ H}_{2} \text{O}_{\text{ (g)}}$ 

If some H<sub>2</sub>O were removed from the system, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
This result is that the amou a. increase	nt of NH₃ would b. decrease	 c. remain unchanged
and the amount of NO <sub>2</sub> v a. increase	vould b. decrease	c. remain unchanged
Question Group 15 Question 43 The following reversible sys	stem is at equilibrium:	
	$COCl_{2(g)} \leftrightarrow CO_{(g)} +$	Cl <sub>2 (g)</sub>
If the pressure of the system	n were increased, then the	equilibrium position would
a. shift to the right	b. shift to the left	c. not shift at all
This result is that the amou a. increase	nt of COCl <sub>2</sub> would b. decrease	 c. remain unchanged
and the amount of CO w a. increase	ould b. decrease	c. remain unchanged
Question 44 The following reversible sys	stem is at equilibrium:	
2	NO (g) + $Cl_{2(g)} \leftrightarrow 2$	NOCI (g)
If the pressure of the system	n were increased, then the	equilibrium position would
a. shift to the right	b. shift to the left	c. not shift at all
This result is that the amou a. increase	nt of NO would b. decrease	c. remain unchanged
and the amount of NOCI a. increase	would b. decrease	c. remain unchanged

The following reversible system is at equilibrium:

 $2 \hspace{.1cm} SO_{3} \hspace{.1cm} {}_{(g)} \hspace{.1cm} \longleftrightarrow \hspace{.1cm} 2 \hspace{.1cm} SO_{2} \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} O_{2} \hspace{.1cm} {}_{(g)}$ 

If the pressure of the system were increased, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
This result is that the am	ount of SO $_3$ would	···
a. increase	b. decrease	c. remain unchanged
and the amount of SO a. increase	<sub>2</sub> would b. decrease	c. remain unchanged
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#### **Question Group 16 Question 46** The following reversible system is at equilibrium:

 $COCl_{2\,(g)} \quad \leftrightarrow \quad CO_{\,(g)} \quad + \quad Cl_{2\,(g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

 a. shift to the right
 b. shift to the left
 c. not shift at all

 This result is that the amount of COCl<sub>2</sub> would \_\_\_\_\_\_ ...
 ...

 a. increase
 b. decrease
 c. remain unchanged

 ...
 and the amount of CO would \_\_\_\_\_\_.

a. increase b. decrease c. remain unchanged

#### **Question 47**

The following reversible system is at equilibrium:

 $2 \ NO \ {}_{(g)} \ \ + \ \ Cl_{2} \ {}_{(g)} \ \ \leftrightarrow \ \ 2 \ NOCl \ {}_{(g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
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This result is that the amount of NO would \_\_\_\_\_\_ ... a. increase b. decrease c. remain unchanged

... and the amount of NOCI would \_\_\_\_\_.a. increaseb. decreasec. remain unchanged

#### **Question 48**

The following reversible system is at equilibrium:

 $2 \hspace{.1cm} SO_{3} \hspace{.1cm} {}_{(g)} \hspace{.1cm} \longleftrightarrow \hspace{.1cm} 2 \hspace{.1cm} SO_{2} \hspace{.1cm} {}_{(g)} \hspace{.1cm} + \hspace{.1cm} O_{2} \hspace{.1cm} {}_{(g)}$ 

If the pressure of the system were decreased, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
This result is that the an	nount of SO $_3$ would	
a. increase	b. decrease	c. remain unchanged
and the amount of SC	D <sub>2</sub> would	
a. increase	b. decrease	c. remain unchanged

# Question Group 17 Question 49

The following reversible system is at equilibrium:

If the temperature of the system were increased, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
This result is that the arr	nount of SO <sub>2</sub> would	<u> </u>
a. increase	b. decrease	c. remain unchanged
and the amount of SC	0 <sub>3</sub> would	
a. increase	b. decrease	c. remain unchanged

# **Question 50**

The following reversible system is at equilibrium:

NO (g) + O<sub>3</sub> (g) 
$$\leftrightarrow$$
 NO<sub>2</sub> (g) + O<sub>2</sub> (g)  
 $\Delta H = -199 \text{ kJ}$ 

If the temperature of the system were increased, then the equilibrium position would

 a. shift to the right
 b. shift to the left
 c. not shift at all

 This result is that the amount of NO would \_\_\_\_\_\_\_.
 ...
 ...

 a. increase
 b. decrease
 c. remain unchanged

 ... and the amount of NO<sub>2</sub> would \_\_\_\_\_\_.
 ...
 c. remain unchanged

 a. increase
 b. decrease
 c. remain unchanged

#### Question 51

The following reversible system is at equilibrium:

If the temperature of the system were increased, then the equilibrium position would

a. shift to the right	b. shift to the left	c. not shift at all
This result is that the a a. increase	mount of H2 would b. decrease	 c. remain unchanged
and the amount of O	2 would b. decrease	c remain unchanged

### Question Group 18 Question 52 The following reversible system is at equilibrium:

If the temperature of the system were decreased, then the equilibrium position would

 a. shift to the right
 b. shift to the left
 c. not shift at all

 This result is that the amount of SO<sub>2</sub> would \_\_\_\_\_\_
 ...

 a. increase
 b. decrease
 c. remain unchanged

 ... and the amount of SO<sub>3</sub> would \_\_\_\_\_\_.
 a. increase
 b. decrease

 b. decrease
 c. remain unchanged

#### **Question 53**

The following reversible system is at equilibrium:

If the temperature of the system were decreased, then the equilibrium position would

 a. shift to the right
 b. shift to the left
 c. not shift at all

 This result is that the amount of NO would \_\_\_\_\_\_\_.
 ...
 ...

 a. increase
 b. decrease
 c. remain unchanged

 ... and the amount of NO<sub>2</sub> would \_\_\_\_\_\_.
 a. increase
 b. decrease

 b. decrease
 c. remain unchanged

#### **Question 54**

The following reversible system is at equilibrium:

If the temperature of the system were decreased, then the equilibrium position would

 a. shift to the right
 b. shift to the left
 c. not shift at all

 This result is that the amount of H<sub>2</sub> would \_\_\_\_\_\_.
 ...
 ...

 a. increase
 b. decrease
 c. remain unchanged

 ... and the amount of O<sub>2</sub> would \_\_\_\_\_\_.
 ...
 c. remain unchanged

 a. increase
 b. decrease
 c. remain unchanged