Chemistry

Name Key
Period ___ Date ___/___/___

17 • Le Chatelier's Principle

1. Consider the equilibrium $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$.
How would the following changes affect the partial pressures of each gas at equilibrium?

	$PCl_3(g)$	$Cl_2(g)$	$PCl_5(g)$
a) addition of PCl_3	↓	↓	↑
b) removal of Cl_2	↑	↑	↓
c) removal of PCl_5	↓	↓	↑
d) decrease in the volume of the container (↑P)	↓	↓	↑
e) addition of He without change in volume	—	—	—

2. Indicate how each of the following changes affects the amount of each gas in the system below, for which $\Delta H_{reaction} = +9.9$ kcal.

9.9kcal + $H_2(g) + CO_2(g) \rightleftharpoons H_2O(g) + CO(g)$ (Heat)

	$H_2(g)$	$CO_2(g)$	$H_2O(g)$	$CO(g)$
a) addition of CO_2	↓	↓	↑	↑
b) addition of H_2O	↑	↑	↓	↓
c) addition of a catalyst	—	—	—	—
d) increase in temperature	↓	↓	↑	↑
e) decrease in the volume of the container	—	—	—	—

3. Consider the equilibrium: $2N_2O(g) + O_2(g) \rightleftharpoons 4NO(g)$
How will the amount of chemicals at equilibrium be affected by

	$2N_2O(g)$	$O_2(g)$	$4NO(g)$
a) adding N_2O	↓	↓	↑
b) removing O_2	↑	↑	↓
c) increasing the volume of the container (↓P)	↓	↓	↑
d) adding a catalyst	—	—	—

4. For the reaction, $4NH_3(g) + 3O_2(g) \rightleftharpoons 2N_2(g) + 6H_2O(l)$
How will the concentration of each chemical be affected by

	$NH_3(g)$	$O_2(g)$	$N_2(g)$	$H_2O(l)$
a) adding O_2 to the system	↓	↓	↑	↑
b) adding N_2 to the system	↑	↑	↓	↓
c) removing H_2O from the system	—	—	—	—
d) decreasing the volume of the container (↑P)	↓	↓	↑	↑

minimal impact as the surface area won't change much

liquids & solids behave differently. Not impacted by pressure changes