LE CHATELIER'S PRINCIPLE 2

1) Complete the table to show what would happen to the position of the following gas phase equilibria if the following changes were made. Tick the correct column in each case.

Equilibrium	ΔH	Increase temperature			Increase pressure			Remove some of B		
		moves left	no move	move right	moves left	no move	move right	moves left	no move	move right
$2\ A(g) + B(g) \rightleftharpoons X(g) + Z(g)$	exothermic									
$A(g) + B(g) \rightleftharpoons X(g) + Z(g)$	endothermic									
$B(g) \rightleftharpoons X(g) + Z(g) + Y(g)$	exothermic									
$X(g) + Y(g) \rightleftharpoons 2\ B(g)$	exothermic									
$2\ X(g) \rightleftharpoons 2\ A(g) + B(g)$	endothermic									

2) Sulfur trioxide is made by the following reaction. The forward reaction is exothermic. This reaction reaches a state of dynamic equilibrium in a closed system.

$$2\ SO_2(g) + O_2(g) \rightleftharpoons 2\ SO_3(g)$$

a) i) What is a closed system? ……

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ii) What are the features of a system in a state of dynamic equilibrium?

1 ……

2 ……

3 ……

4 ……

b) i) If the temperature of this equilibrium was increased, what would happen to the yield of sulfur trioxide?

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ii) Explain your reasoning. ……

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c) i) If the pressure of this equilibrium was increased, what would happen to the yield of sulfur trioxide?

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ii) Explain your reasoning. ……

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d) i) If more oxygen was added to the mixture, what would happen to the yield of sulfur trioxide?

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ii) Explain your reasoning. ……

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3) When bismuth chloride is added to water, a reaction occurs and a white precipitate forms. The following equilibrium is set up. What would be the effect on the amount of precipitate if sodium hydroxide solution is added to the mixture (explain your answer)?

$$BiCl_3(aq) + H_2O(l) \rightleftharpoons BiOCl(s) + 2\,HCl(aq)$$

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