Answer the questions below based on your reading and on your knowledge of chemistry.

1. For each of the following, what effect would an increase in pressure have on equilibrium?
   a. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ _____
   b. $4H_2(g) + CS_2(g) \rightleftharpoons CH_4(g) + 2H_2S(g)$ _____
   c. $CO(g) + H_2O(g) \rightleftharpoons H_2(g) + CO_2(g)$ _____
   d. $H_2(g) + F_2(g) \rightleftharpoons 2HF(g)$ _____
   e. $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ _____
2. For each of the following, what effect would an increase in temperature have on equilibrium?
   a. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ $\Delta H = -92$ kJ _____
   b. $C(s) + H_2O(g) + \text{heat} \rightleftharpoons CO(g) + H_2(g)$ _____
   c. $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g) + \text{heat}$ _____
   d. $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) + \text{heat}$ _____
   e. $H_2O(\ell) \rightleftharpoons H^+(aq) + OH^-(aq)$ $\Delta H = 55.8$ kJ _____
3. For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ [$\Delta H = 52.7$ kJ], what effect will each of the following have on equilibrium?
   a. Addition of $H_2(g)$ _____
   b. Removal of $I_2(g)$ _____
   c. Increase in temperature _____
   d. Increase in pressure _____
   e. Addition of $HI(g)$ _____
4. Explain LeChatelier's principal based on collision theory. _____

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5. If heat speeds up all reactions, both forward and reverse, why does it effect equilibrium? _____

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