

Worksheet 6.1: Solutions

Changing the position of equilibrium

No.	Answer
1	<p>a i Position of equilibrium moves to right. ii Equilibrium constant increases.</p> <p>b i Position of moves to left. ii Equilibrium constant decreases.</p> <p>c i Position of moves to right. ii Equilibrium constant increases.</p>
2	<p>a Shifts to the right. b Shifts to the left. c Shifts to the right.</p>
3	The addition of an unreactive gas has no effect on the equilibrium position or constant. Even though the overall gas pressure increases as there is more gas present, the partial pressures of the individual gases involved in the reaction are unaffected.
4	<p>a Decrease temperature. b Decrease pressure (partial pressure of one or both reactants) c Remove NO.</p>
5	<p>a Using more concentrated acid provides a greater concentration of a reactant and so forces the reaction <i>to the right</i>. b A catalyst has no effect on the equilibrium position, it only increases the rate of reaction. c As this is an exothermic reaction, heating would force the reaction <i>to the left</i>. d Removal of NO takes away a product and so forces the reaction <i>to the right</i>.</p>
6	Equilibrium and rate are measures of two different things. The corrosion of iron occurs to a large extent and so the reaction has a large equilibrium constant. It is quite a slow reaction under normal conditions of temperature and pressure and so rate of achieving equilibrium is slow.
7	<p>In each reaction system, the addition of water dilutes all species and so the reaction will proceed to the side with the greater number of particles (as it will be 'diluted' to the greatest extent). a Reaction proceeds to the left. b Reaction is unaffected.</p>
8	<p>a The equilibrium position moves to the right; the equilibrium constant is unaffected. b The equilibrium position moves to the left, as the reaction is exothermic; the equilibrium constant decreases. c Neither the equilibrium position nor its constant is affected. d Volume decreases, so pressure increases and the reaction proceeds to the side with least number of particles, i.e. to the right. The equilibrium constant is unaffected. e Using a catalyst has no effect on either the equilibrium position or the constant.</p>

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9	The H_3O^+ concentration would decrease, as the position of equilibrium will shift to the left, to remove some of the added acetate ions.
10	