Year 12 Chemistry

Quick Quiz: Using and Controlling Reactions

1.

(a) $2CH_4O_{(l)} + 3O_{2\,(g)} \rightarrow 2CO_{2\,(g)} + 4H_2O_{(l)} \quad \Delta H = -7.2\times10^2 \text{ kJ mol}^{-1}$

(b) $M_{CH_4O} = 32.04 \text{ g mol}^{-1}$

$7.2\times10^2 \div 32.04 = 22 \text{ kJ g}^{-1}$

$\rho = 0.79 \text{ g mL}^{-1} = 790 \text{ g L}^{-1}$

$22\times790 = 1.8\times10^4 \text{ kJ L}^{-1}$

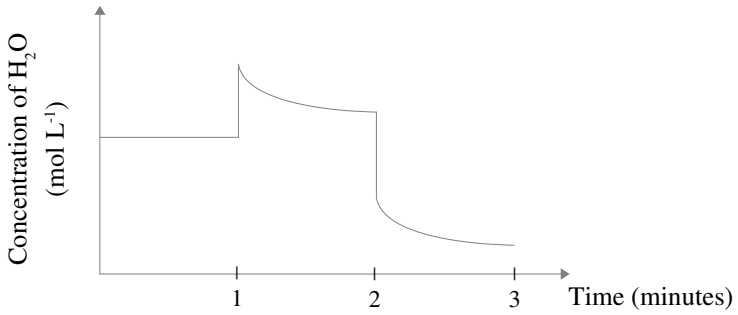
2.

(a) $H_2SO_{4\,(aq)} + 2NaOH_{\,(aq)} \rightarrow Na_2SO_{4\,(aq)} + 2H_2O_{\,(l)} \quad \Delta H = -57.1 \text{ kJ mol}^{-1}$

(b) Hydrogen ions transferred.

3.

(a)



(b)

(i) Increasing the temperature would cause the equilibrium position to shift in the direction that would oppose the change by absorbing energy. This reaction is exothermic, so the backward reaction will be favoured, therefore the yield is reduced. The value of K_c has been decreased, so the concentrations of reactants and products are altered by reaction to until the proportion matches K_c at the new temperature.
Increasing the temperature increases the frequency of collisions of the particles and, since more energy is available, increases the productivity of collisions. The rate of reaction will increase.

(ii) Increasing the pressure would cause the equilibrium position to shift in the direction that would oppose the change by decreasing the number of moles of gas present. The forward reaction would be favoured, therefore the yield increases. The value of K_c is unaffected by the pressure change, but the proportion of concentrations of reactants and products was changed, so the net reaction occurs until the proportion matches Kc.
Increasing the pressure increases the frequency of collisions of the particles, which increases the rate of reaction.