Equilibrium (MCQ)

1. A catalyst is added to a system in equilibrium.

What is the effect on the rates of the forward and reverse reactions?

A There is no effect on the rate in either direction.
B Both rates increase by the same factor.
C The rate in the forward direction increases by a greater factor than the reverse direction.
D The rate in the reverse direction increases by a greater factor than the forward direction.

Your answer ☐ **[1]**

2. The reversible reaction below is at equilibrium.

$2SO_2(g) + O_2(g) \leftrightharpoons 2SO_3(g)$ $\Delta H = -197$ kJ mol^{-1}

Which changes in pressure and temperature would shift the equilibrium position towards the products?

	Pressure	**Temperature**
A	Decrease	Decrease
B	Decrease	Increase
C	Increase	Decrease
D	Increase	Increase

Your answer ☐ **[1]**

3. The reversible reaction below is at equilibrium.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

What is the expression for K_c?

A $\dfrac{[N_2(g)]\,[H_2(g)]^3}{[NH_3(g)]^2}$

B $\dfrac{[NH_3(g)]^2}{[N_2(g)]\,[H_2(g)]^3}$

C $\dfrac{[N_2(g)] + 3[H_2(g)]}{2[NH_3(g)]}$

D $\dfrac{2[NH_3(g)]}{[N_2(g)] + 3[H_2(g)]}$

Your answer ☐ **[1]**

4. The reversible reaction below is allowed to reach equilibrium.

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ $\quad \Delta H = -9.4\ \text{kJ mol}^{-1}$

Which change in conditions would be expected to shift the equilibrium position towards the products?

A decrease the pressure
B decrease the temperature
C increase the pressure
D increase the temperature

Your answer ☐ **[1]**

5. Which statement is **not** correct for a system in dynamic equilibrium?

A. The concentrations of products and reactants are the same.
B. The equilibrium can be achieved from both sides.
C. The rate of the forward reaction is equal to the rate of the reverse reaction.
D. The system is closed.

Your answer ☐

[1]

6. Carbon monoxide reacts with steam in the following reaction equation:

$$CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g) \qquad \Delta H = -40 \text{ kJ mol}^{-1}$$

Which change will shift the position of equilibrium to the right hand side of the equation?

A. decrease in pressure
B. increase in pressure
C. decrease in temperature
D. increase in temperature

Your answer ☐

[1]

END OF QUESTION PAPER

Mark scheme – Equilibrium (MCQ)

Question			Answer/Indicative content	Marks	Guidance
1			**B**	1 (AO1.1)	
			Total	**1**	
2			**C**	**1**	**Examiner's Comments** This question was a good discriminator with well-prepared candidates usually selecting the correct option of C. Incorrect responses were reasonably evenly split across the other options, suggesting guesses and poor preparation.
			Total	**1**	
3			**B**	**1**	**Examiner's Comments** Most candidates responded with the correct response of B. The most common incorrect response was the inverse expression shown in A.
			Total	**1**	
4			B	**1**	**Examiner's Comments** This question discriminated very well with most able candidates obtaining the correct answer.
			Total	**1**	
5			A	1	
			Total	**1**	
6			C	1	
			Total	**1**	