Exam Papers Practice

17.1 The Equilibrium Law

Question Paper

Course	DP IB Chemistry
Section	17. Equilibrium (HL only)
Topic	17.1 The Equilibrium Law
Difficulty	Medium

To be used by all students preparing for DP IB Chemistry HL
Students of other boards may also find this useful

Question 1

When gaseous dinitrogen pentoxide, $N_2O_5(g)$, decomposes at 358 K, the following equilibrium is established:

$$2N_2O_5(g) \rightleftharpoons 4NO_2(g) + O_2(g)$$

2.0 mol of $N_2O_5(g)$ were placed in a 1.0 dm^3 container and allowed to reach equilibrium. At equilibrium 1.0 mol of $N_2O_5(g)$ were present. What is the value of K_c?

A. 0.125

B. 1

C. 2

D. 8

[1 mark]

Question 2

Consider the following reversible reaction:

$$3O_2(g) \rightleftharpoons 2O_3(g)$$

What is the value of K_c when the equilibrium concentrations are $[O_2] = 4.0$ mol dm^{-3} and $[O_3] = 4.0$ mol dm^{-3} ?

A. 0.25

B. 4

C. 16

D. 64

[1 mark]

Question 3

Which if the following will shift the position of equilibrium to the right in the reaction shown?

$$2N_2O_5(g) \rightleftharpoons 4NO_2(g) + O_2(g) \quad \Delta H = +219.2\,kJ$$

I. Decreasing the concentration of $NO_2(g)$
II. Decreasing the temperature
III. Decreasing the pressure

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 4

Hydrogen iodide decomposes to form hydrogen and iodine vapour.

$$2HI(g) \rightleftharpoons H_2(g) + I_2(g)$$

What is the effect of decreasing the volume of the equilibrium mixture at constant temperature?

A. The amount of $H_2(g)$ remains the same but its concentration decreases

B. The forward reaction is favoured

C. The backward reaction is favoured

D. The value of K_c remains unchanged

[1 mark]

Question 5

A mixture of 0.40 mol of $SO_2(g)$ and 0.40 mol of $O_2(g)$ was placed in a 1 dm^3 container. The following equilibrium took place:

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

At equilibrium the mixture contained 0.25 mol of $O_2(g)$ .How many moles of $SO_2(g)$ and $SO_3(g)$ were present at equilibrium?

	$SO_2(g)$ / mol	$SO_3(g)$ / mol
A	0.25	0.15
B	0.30	0.15
C	0.10	0.30
D	0.25	0.30

[1 mark]