AP CHEMISTRY • EXERCISE SHEET

7.5 Magnitude of the Equilibrium Constant

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS equilibrium constant 平衡常数

Objective

Build the skills to answer exam questions on the **magnitude of the equilibrium constant**.

You must be able to:

- interpret a **large** K (products favored) and a **small** K (reactants favored)
- relate $K \approx 1$ to comparable amounts
- reason about the position of equilibrium

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

What the size of K tells you

- $K \gg 1$: at equilibrium there are **mostly products** — the reaction "goes nearly to completion".
- $K \ll 1$: mostly **reactants** — the reaction "barely proceeds".
- $K \approx 1$: comparable amounts of reactants and products.

A worked interpretation

$K = 1 \times 10^{8} \rightarrow$ very large $\rightarrow$ products strongly favored. $K = 1 \times 10^{-6} \rightarrow$ very small $\rightarrow$ reactants favored.

K is not the rate

A large K says the **position** favors products, **not** that the reaction is fast. Speed (kinetics) and extent (equilibrium) are separate ideas.

Comparing two reactions

The one with the **larger** K has the equilibrium lying further toward products under the same conditions.

2 Practice

Now apply the methods above.

2.1 A reaction has $K = 1 \times 10^{10}$. Are products or reactants favored? [1]

2.2 A reaction has $K = 1 \times 10^{-5}$. Are products or reactants favored? [1]

2.3 Does a large K mean the reaction is fast? [1]

3 Exam-style questions

3.1 A very large equilibrium constant means at equilibrium there are mostly [1]

A B
C D

A reactants
B products
C equal amounts
D no molecules

3.2 Two reactions have $K_1 = 5 \times 10^{3}$ and $K_2 = 2 \times 10^{-2}$.

(a) State which favors products more. [1]

(b) Describe the equilibrium mixture for reaction 2. [2]

3.3 Explain why a large K does not tell you how quickly equilibrium is reached. [2]