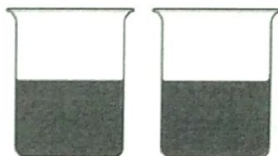


18 • Equilibrium

18.1 QUICK CHECK

Check off each item if you can do the question. Write down a question to ask if you cannot do the question.

- Here are two beakers that represent the reactants (left) and products (right) in a reaction. Is this reaction at equilibrium?
Not enough information
 Justify your answer.



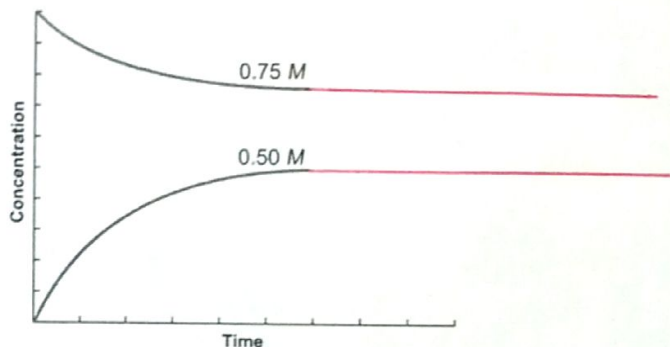
Scratch Paper/Notes:

Equal volumes does not automatically mean equilibrium

What is **equal** at equilibrium?

rate of forward rxn = rate of reverse rxn

- Consider this graph. The student stopped collecting data when the reaction reached equilibrium. What would the lines look like if they continued? (Add to the graph.)

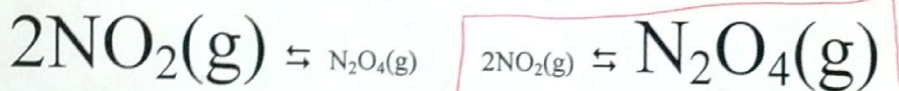


- Reactant-favored or Product-favored?**

Given the following reaction:

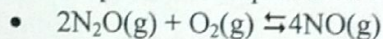


- This reaction is reactant-favored product-favored
- Which matches this situation more closely?

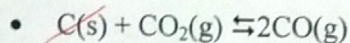


- Equilibrium Expressions**

Write the equilibrium expressions for the following reactions:

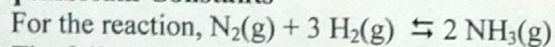


$$K_{\text{eq}} = \frac{[\text{NO}]^4}{[\text{N}_2\text{O}]^2 [\text{O}_2]}$$



$$K_{\text{eq}} = \frac{[\text{CO}]^2}{[\text{CO}_2]}$$

- Equilibrium Constants**



The following concentrations are found at equilibrium:

$[\text{N}_2] = 0.10 \text{ M}$ $[\text{H}_2] = 0.20 \text{ M}$ $[\text{NH}_3] = 0.30 \text{ M}$

Write the expression and find the value for K_{eq} .

$$K_{\text{eq}} = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3} = \frac{(0.30)^2}{(0.10)(0.20)^3} = 112.5$$