

1. Write the expression for Q :

$$Q = \frac{[CO][H_2O]}{[CO_2][H_2]}$$

2. Substitute the given values:

$$Q = \frac{(0.30)(0.20)}{(0.15)(0.50)} = \frac{0.06}{0.075} = 0.80$$

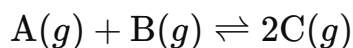
3. Compare Q with K :

- $Q = 0.80$ and $K = 2.0$.
- Since $Q < K$, the reaction will proceed **forward** to produce more products (CO and H_2O) to reach equilibrium.

Answer: The reaction will proceed **forward** toward the products.

4. Practice Problem: Identifying Equilibrium

Problem: For the reaction:



At equilibrium, the following concentrations are observed:

- $[A] = 0.10 \text{ M}$
- $[B] = 0.10 \text{ M}$
- $[C] = 0.20 \text{ M}$

Calculate the reaction quotient Q and determine whether the system is at equilibrium.

Solution:

1. Write the expression for Q :

$$Q = \frac{[C]^2}{[A][B]}$$

