

The value of K_c of the reaction $2\text{HI} \rightleftharpoons \text{H}_2 + \text{I}_2$ is 1×10^{-4} . At a given time, the composition of mixture is as follows:-

$$[\text{HI}] = 2 \times 10^{-5} \text{ mol} \quad [\text{H}_2] = 1 \times 10^{-5} \text{ mol} \quad [\text{I}_2] = 10^{-5} \text{ mol}$$

In which direction the reaction proceeds??



Let volume of the container be $V \text{ L}$.

$$[\text{HI}] = \frac{2 \times 10^{-5}}{V} \quad [\text{H}_2] = \frac{10^{-5}}{V} \quad [\text{I}_2] = \frac{10^{-5}}{V}$$

So, Reaction Quotient

$$Q = \frac{[\text{H}_2][\text{I}_2]}{[\text{HI}]^2}$$

$$Q = \frac{(10^{-5}/V)(10^{-5}/V)}{(2 \times 10^{-5}/V)^2}$$

$$\therefore Q = 0.25$$

Since $Q > K_c$ the reaction will proceed backwards