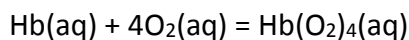


### Answer on Question # 60259 - Chemistry - Physical Chemistry

One molecule of haemoglobin, Hb, can bind with four molecules of oxygen according to the following equation.



When the equilibrium concentration of  $\text{O}_2$  is  $7.6 \times 10^{-6} \text{ mol dm}^{-3}$ , the equilibrium concentrations of Hb and  $\text{Hb}(\text{O}_2)_4$  are equal.

What is the value of  $K_c$  for this equilibrium?

#### Solution

The equilibrium constant expression for the reaction given is

$$K_c = \frac{[\text{Hb}(\text{O}_2)_4]}{[\text{Hb}][\text{O}_2]^4};$$

As the equilibrium concentrations of Hb and  $\text{Hb}(\text{O}_2)_4$  are equal, the equilibrium constant expression transforms to

$$K_c = \frac{1}{[\text{O}_2]^4};$$

$$K_c = \frac{1}{(7.6 \times 10^{-6})^4} = 3.0 \times 10^{20}.$$

Answer:  $K_c = 3.0 \times 10^{20}$ .