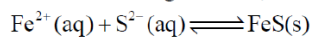


*Q.3 For the following reaction, the equilibrium constant K_c at 298 K is 1.6×10^{17}



When equal volumes of 0.06 M $\text{Fe}^{2+}(\text{aq})$ and 0.2 M $\text{S}^{2-}(\text{aq})$ solutions are mixed, the equilibrium concentration of $\text{Fe}^{2+}(\text{aq})$ is found to be $Y \times 10^{-17}$ M. The value of Y is

Sol. **8.93**

| | | | | | | |
|--------------|-----------------------------|-----|----------------------------|----------------------|------------------------|----------------------------|
| | $\text{Fe}^{2+}(\text{aq})$ | $+$ | $\text{S}^{2-}(\text{aq})$ | \rightleftharpoons | $\text{FeS}(\text{s})$ | $K_c = 1.6 \times 10^{17}$ |
| Initial | 0.06 M | | 0.2 M | | | |
| After mixing | 0.03 M | | 0.1 M | | | |
| | ? | | 0.07M | | | |

$$1.6 \times 10^{17} = \frac{1}{[\text{Fe}^{2+}] \times 0.07} \quad \text{or}$$

$$[\text{Fe}^{2+}] = \frac{10^{-17}}{1.6 \times 0.07} = \frac{10^{-15}}{11.2} = 8.928 \times 10^{-17}$$

$$\text{or } 8.93 \times 10^{-17} = Y \times 10^{-17}$$