Answer on the question #43058, Chemistry, Physical Chemistry

Question:

A+2B <===>C

For the above reaction, the equilibrium constant is 4. At equilibrium the concentrations of A and C are found to be 4 M each. What then is the concentration of B?

a) 1 M
b) 2 M
c) 0.5 M
d) 4 M

Solution:

According to the definition, the equilibrium constant of the reaction A+2B <===>C is:

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

Then, the concentration of B is:

$$[\mathrm{B}] = \sqrt{\frac{[\mathrm{C}]}{\mathrm{K}[\mathrm{A}]}} = \sqrt{\frac{4}{4 * 4}} = 0.5 \frac{\mathrm{mol}}{\mathrm{L}}$$

Answer: 0.5 mol/L