

More Challenging Key Problems - Exam!

Jan 11/11.

new concept

	A (g)	B (g)	C (g)	
at equilibrium	initial []	0.200 mol/L	0.400 mol/L	0.100 mol/L
	initial amnt	1.00 mol	2.00 mol	0.500 mol
	final amnt	1.00 - x	2.00 + x	0.500 + x
at equilibrium	initial []	$\frac{1.00 - x}{10}$	$\frac{2.00 + x}{10}$	$\frac{0.500 + x}{10}$
		0.0788	0.221	0.0712

* To an equilibrium to equilibrium concentration of ..., a stress is imposed. The volume is doubled, find new equilibrium []'s. Assume constant temp.

S: ↓P (↑V) * new concept

Le Chatelier's

R: ↑P

H: more moles of gas (to increase pressure)

D: shift right

E: ∴ ↓n_A, ↑n_B, ↑n_C

* let x represent the amount of A that reacts.

FIND:

Keq = $\frac{[B][C]}{[A]}$

keq = $\frac{[B][C]}{[A]}$

keq = $\frac{[0.4][0.1]}{[0.2]}$

0.2 = $\frac{(\frac{2+x}{10})(\frac{0.5+x}{10})}{(\frac{1-x}{10})}$

keq = 0.2

0.2 = $(\frac{2+x}{10})(\frac{0.5+x}{10})(\frac{10}{1-x})$

0.2(10)(1-x) = x² + 2.5x + 1

2 - 2x = x² + 2.5x + 1

0 = x² + 4.5x - 1

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-4.5 \pm \sqrt{(4.5)^2 - 4(1)(-1)}}{2(1)}$

$x = \frac{-4.5 \pm 4.92}{2}$

x = -4.71 or x = 0.212

extraneous

good

∴ [A] = $\frac{1-0.212}{10}$ [B] = $\frac{2+0.212}{10}$

= 0.0788 mol/L

= 0.221 mol/L

[C] = $\frac{0.5+0.212}{10}$

= 0.0712 mol/L