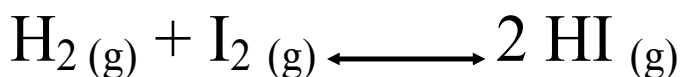


ICE Questions:

We can do K_{eq} questions when more than just the final concentrations are given. By examining a combination of the initial concentrations, final concentrations and/or change in concentrations, we can solve for K_{eq}

1.00 mol of colourless hydrogen gas and 1.00 mol of violet iodine vapour are sealed in a 1.00 L flask and allowed to react at 450 degrees C. At equilibrium, 1.56 mol of colourless hydrogen iodide is present, together with some of the reactant gases. Calculate K_{eq} for the reaction.



	H ₂	I ₂	HI
Initial	1.00 mol	1.00 mol	0
Change	-0.78 mol	-0.78 mol	+1.56 mol
Equilibrium Final	0.22 mol	0.22 mol	1.56 mol

← reaction dependent.

⇒ K_{eq}

$$K_{eq} = \frac{[\text{HI}]^2}{[\text{H}_2][\text{I}_2]} = \frac{[1.56]^2}{[0.22][0.22]} = 50.3$$

← 1.56 mol

1.0 mol of N_2O_4 was introduced into a 1.0L flask. After equilibrium was established, only 0.80 mol of N_2O_4 . Calculate K_{eq} .

$$\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2 \text{NO}_2(\text{g})$$

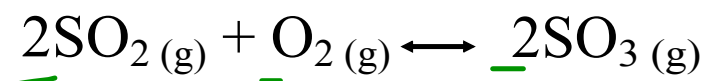
	N_2O_4	NO_2
I	- 1.0 mol	+ 0
C	0.20 mol	0.40 ← 0.20 × 2
E	0.80 mol	0.40

depends on moles in reaction →

Keq →

$$K_{\text{eq}} = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]} = \frac{[0.40]^2}{[0.80]} = 0.20$$

A 10.0 L bulb is filled with 4.0 mol of SO_2 , 2.2 mol of O_2 and 5.6 mol of SO_3 . After equilibrium of the formation reaction, there was 2.6 mol of SO_2 . Calculate K_{eq} .



depends on moles from reaction →

	SO_2	O_2	SO_3
I	0.40 mol	0.22	0.56
C	0.14	0.07	0.14
E	0.26 mol	0.15	0.70

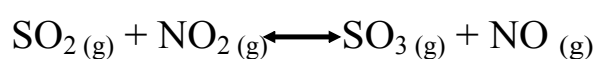
← K_{eq}

$\frac{0.14}{2}$

$$K_{\text{eq}} = \frac{[\text{SO}_3]^2}{[\text{SO}_2]^2 [\text{O}_2]} = \frac{[0.70]^2}{[0.26]^2 [0.15]} = 48$$

$$[0.26]^2 [0.15]$$

A 5.0 L vessel contained 6.0 mol of SO₂, 2.5 mol of NO₂ and 1.0 mol of SO₃. At equilibrium the vessel was found to contain 3.0 mol of SO₃. Calculate K_{eq}.



$$C = \frac{n}{V}$$

	SO ₂	NO ₂	SO ₃	NO
I	1.2 mol/L	0.50 mol/L	0.20 mol/L	0
C	-0.40	0.40	+0.40 mol/L	+0.40
E	0.80	0.10	0.60 mol/L	0.40 ← K _{eq}

moles
from
rxn.

$$K_{eq} = \frac{[\text{SO}_3][\text{NO}]}{[\text{SO}_2][\text{NO}_2]} = \frac{[0.60][0.40]}{[0.80][0.10]} = \underline{\underline{3.0}}$$