The equilibrium constant, K_P, equals 3.40 at 25 °C for the isomerization reaction:

cis-2-butene ⇌ *trans*-2-butene.

If a flask initially contains 3.40 atm of each gas, in what direction will the system shift to reach equilibrium?

It will shift left.

It will shift right.

The system is already at equilibrium.

The system is not at equilibrium and will remain in an unequilibrated state.

Question 2 — 1 points — Save

For the isomerization reaction:

butane ⇌ isobutane

K_P equals 25 at 500 °C. If the initial pressures of butane and isobutane are 0.0 atm and 10.0 atm, respectively, what are the pressures of the two gases at equilbrium?

P(butane) = 9.6 atm and *P*(isobutane) = 0.38 atm

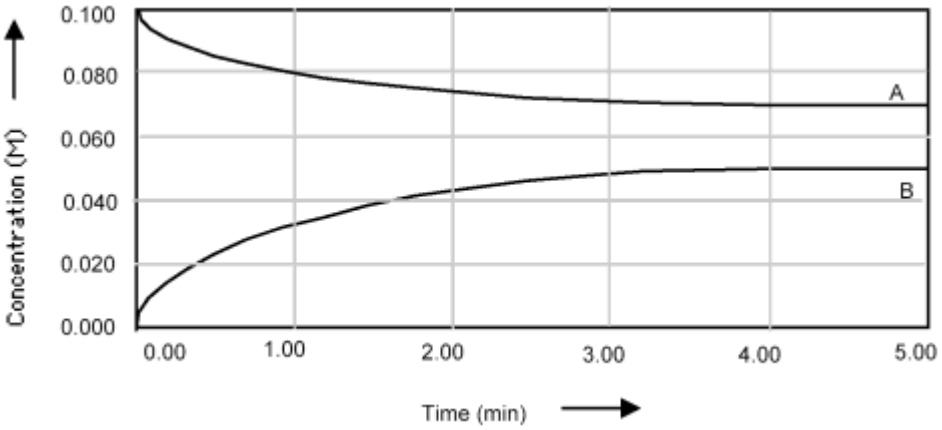
P(butane) = 0.40 atm and *P*(isobutane) = 10. atm

P(butane) = 10 atm and *P*(isobutane) = 0.40 atm

P(butane) = 0.38 atm and *P*(isobutane) = 9.6 atm

Question 3 — 0.5 points — Save

Shown below is a concentration vs. time plot for the reaction A ⇌ B. For this reaction the value of the equilibrium constant is



$K_C < 1$.

$K_C = 0$.

$K_C = 1$.

$K_C > 1$.

Question 4 — 1 points — Save

Nitric oxide reacts with oxygen to form nitrogen dioxide:

$$2\,NO(g) + O_2(g) \rightleftharpoons 2\,NO_2(g)$$

What is K_C for the forward reaction if the equilibrium concentration of NO is 0.200 M, O_2 is 0.100 M, and NO_2 is 0.250 M at 25 °C?

15.6

Question 5 — 1 points — Save

An equilibrium mixture of CO, O_2 and CO_2 at a certain temperature contains 0.0010 M CO and 0.0020 M O_2. At this temperature, K_C equals 1.4×10^3 for the reaction:

$$2\,CO(g) + O_2(g) \rightleftharpoons 2\,CO_2(g).$$

What is the equilibrium concentration of CO_2?

1.7×10^{-3} M

2.8×10^{-6} M

3.7×10^{-2} M

2.8×10^{-3} M

Question 6 — 1 points — Save

Phosphorus pentachloride decomposes to phosphorus trichloride and chlorine gas at elevated temperatures by the following reaction:

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g).$$

If $K_C = 2.2$ at 255°C, what is the value of K_P at the same temperature?

Question 7 — 1 points — Save

At a certain temperature the equilibrium constant, K_C, equals 0.11 for the reaction:

$$2\,ICl(g) \rightleftharpoons I_2(g) + Cl_2(g).$$

What is the equilibrium concentration (in mol/L) of ICl if 0.50 mol of I_2 and 0.50

mol of Cl_2 are initially mixed in a 2.0-L flask? [Enter only a number; no units.]

Question 8 1 points Save

Phosphorus pentachloride decomposes to phosphorus trichloride at high temperatures according to the equation

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

At 250°C, 0.250 M PCl_5 is added to the flask. If K_C = 1.80, what are the equilibrium concentrations of each gas?

$[PCl_5]$ = 1.80 M, $[PCl_3]$ = 1.80 M, and $[Cl_2]$ = 1.80 M

$[PCl_5]$ = 0.0280 M, $[PCl_3]$ = 0.222 M, and $[Cl_2]$ = 0.222 M

$[PCl_5]$ = 2.27 M, $[PCl_3]$ = 2.02 M, and $[Cl_2]$ = 2.02 M

$[PCl_5]$ = 0.125 M, $[PCl_3]$ = 0.474 M, and $[Cl_2]$ = 0.474 M

Question 9 1 points Save

The decomposition of ammonia is: $2\,NH_3(g) \rightleftharpoons N_2(g) + 3\,H_2(g)$. If the partial pressure of ammonia is 1.6 x 10^{-3} atm and the partial pressures of N_2 and H_2 are each 0.25 atm at equilibrium, what is the value for K_C at 400°C for the forward reaction?

6.3 x 10^3

0.50

4.6 x 10^6

1.4

Question 10 1 points Save

K_P is equal to 48.7 at 731 K for the reaction: $H_2(g) + I_2(g) \rightleftharpoons 2\,HI(g)$. Initially the mixture contains 0.0860 atm each of H_2 and I_2 and 0.5000 atm of HI. What is the pressure of HI at equilibrium? Remember to use at least three significant figures in your answer

0.07345 units are atm, but I think you should just input the number only.

Question 11 1 points Save

At 25°C, a certain first order reaction has a rate constant equal to 1.00 x 10^{-3} s^{-1} and an equilibrium constant, K_C, equal to 4.18. What is the rate constant for the reverse reaction?

2.39 x 10^{-4} s^{-1}

4.18 x 10^3 s^{-1}

4.18 x 10^{-3} s^{-1}

2.39 x 10^2 s^{-1}