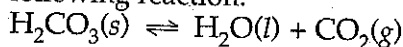


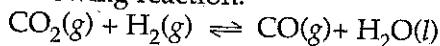
16-2 Practice Problems (continued)

17. Write the equilibrium expression for the following reaction.



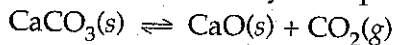
$$K_{\text{eq}} = [\text{CO}_2]$$

18. Write the equilibrium expression for the following reaction.



$$K_{\text{eq}} = \frac{[\text{CO}]}{[\text{CO}_2][\text{H}_2]}$$

19. At 740°C, $K_{\text{eq}} = 0.0060$ for the decomposition of calcium carbonate (CaCO_3), which is described by the equation

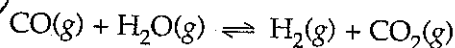


Find Q and predict how the reaction will proceed if $[\text{CO}_2] = 0.0004 \text{ M}$.

$$Q = 0.0004$$

TO Right inc P
dec R

20. For the reaction

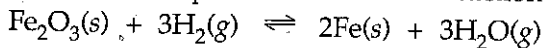


$K_{\text{eq}} = 5.10$ at 527°C. If $[\text{CO}] = 0.15 \text{ M}$, $[\text{H}_2\text{O}] = 0.25 \text{ M}$, $[\text{H}_2] = 0.42 \text{ M}$, and $[\text{CO}_2] = 0.37 \text{ M}$, calculate Q and determine how the reaction will proceed.

$$Q = 4.1$$

TO Right Inc P
Dec R

21. At 340°C, $K_{\text{eq}} = 0.064$ for the reaction

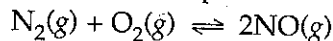


Given that $[\text{H}_2] = 0.45 \text{ M}$ and $[\text{H}_2\text{O}] = 0.37 \text{ M}$, find Q and predict how the reaction will proceed.

$$Q = 0.56 \text{ TO Left}$$

Dec P, Inc R

22. At 2130°C, $K_{\text{eq}} = 0.0025$ for the reaction

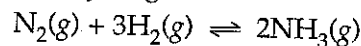


If $[\text{N}_2] = 0.81 \text{ M}$, $[\text{O}_2] = 0.75 \text{ M}$, and $[\text{NO}] = 0.030 \text{ M}$, find Q and determine the direction in which the reaction will proceed.

$$Q = 0.0015 \text{ TO Right}$$

More P
Less R

23. Ammonia is synthesized from nitrogen and hydrogen in the reaction

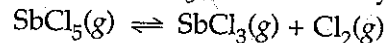


At 500°C, the equilibrium constant for this reaction is 0.080. Given that $[\text{NH}_3] = 0.0596 \text{ M}$, $[\text{N}_2] = 0.600 \text{ M}$, and $[\text{H}_2] = 0.420 \text{ M}$, find Q and predict how the reaction will proceed.

$$Q = 0.080$$

at EQUI

24. The decomposition of antimony pentachloride (SbCl_5) is described by the equation

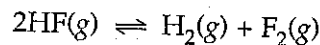


At 448°C, the equilibrium constant for this reaction is 0.0251. What is the value of Q if $[\text{SbCl}_5] = 0.095 \text{ M}$, $[\text{SbCl}_3] = 0.020 \text{ M}$, and $[\text{Cl}_2] = 0.050 \text{ M}$? How will this reaction proceed?

$$Q = 0.010$$

TO Right
More P, Less R

25. At 1000°C, $K_{\text{eq}} = 1.0 \times 10^{-13}$ for the decomposition of hydrofluoric acid (HF), as described in the reaction

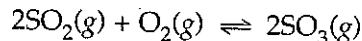


If $[\text{HF}] = 23.0 \text{ M}$, $[\text{H}_2] = 0.540 \text{ M}$, and $[\text{F}_2] = 0.380 \text{ M}$, determine the value of Q and predict how the reaction will proceed.

$$Q = 3.88 \times 10^{-4}$$

TO LEFT
MORE R, Less P

26. At 1227°C, K_{eq} for the following reaction is 0.15.



If $[\text{SO}_2] = 0.344 \text{ M}$, $[\text{O}_2] = 0.172 \text{ M}$, and $[\text{SO}_3] = 0.056 \text{ M}$, find Q and determine how the reaction will proceed.

$$Q = 0.15$$

AT EQUI