Answers to Chapter Review page 522

20. By using an analogy. For example, soda enters a straw because air pressure on the surface of the soda outside the straw is greater than the air pressure inside the straw. Soda goes up the straw by the air pressure outside the straw. Equilibrium is reached when the weight of the raised soda is equal to the force attempting to push the soda down.

21. a. forward

b. reverse

22. a. forward

b. forward

c. neither

d. forward

e. reverse

f. neither

g. reverse

h. neither

23. high pressure, because the forward reaction converts three molecules into two, relieving the stress imposed by the pressure increase

24. a. high reactant concentrations, high pressure, low temperature

b. high reactant concentrations, pressure not relevant, low temperature

c. high reactant concentrations, pressure not relevant, high temperature

d. high reactant concentrations, high pressure, low temperature

25. increasing the sulfur trioxide concentration, decreasing the concentration of either reactant, decreasing the pressure, or increasing the temperature

26. $K_{eq} = \dfrac{[SO_3]^2}{[SO_2]^2[O_2]}$

27. increasing the temperature or the phosphorus pentachloride concentration; decreasing the pressure or either of the product concentrations

28. $K_{eq} = \dfrac{[Cl_2][PCl_3]}{[PCl_5]}$