Chemistry Review

Unit 6 – Kinetics / Equilibrium

Kinetics, Equilibrium, Spontaneous Reactions

**Kinetics and Equilibrium**

**1. Collision theory states that a reaction is most likely to occur if reactant particles collide with the proper energy and orientation.**

**2. The rate of a chemical reaction depends on several factors: temperature, concentration, nature of the reactants, surface area and the presence of a catalyst.**

**3. Some chemical and physical changes can reach equilibrium.**

**4. At equilibrium the rate of the forward reaction equals the rate of the reverse reaction.**

**5. The measurable quantities of reactants and products remain constant at equilibrium.**

**6. LeChatelier’s principle can be used to predict the effect of stress on a system in equilibrium.**

* Stresses include a change in pressure, volume, concentration, and temperature.

**7. Energy absorbed or released by a chemical reaction can be represented by a potential energy diagram.**

**8. The amount of energy released or absorbed during a chemical reaction is the heat of reaction.**

* Heat of reaction equals the PE of the products – PE of reactants.
* Positive heat of reaction implies an endothermic reaction.
* Negative heat of reaction implies an exothermic reaction.

**9. A catalyst provides an alternative pathway for a chemical reaction. The catalyzed reaction requires a lower activation energy than the uncatalyzed reaction.**

* Adding a catalyst increases the rate of the forward and reverse reactions equally, so there is no shift in equilibrium.

**10. Entropy is a measure of the randomness or disorder in a system. A system with greater disorder has greater entropy.**

**11. Systems in nature tend to undergo changes towards lower energy and higher entropy.**

**12. Exothermic reactions that result in increased entropy are spontaneous.**

**Need to Know:**

**Chemical reactions requires an effective collision**

**Faster reaction rate = increase temperature (more effective collisions, more energy)**

**Faster reaction rate = increase concentration**

120. Be able to recognize and read potential energy diagrams

121. ΔH is (+) for endothermic reactions and is (-) for exothermic reactions.

122. The rates of the forward and reverse reactions are equal at equilibrium.

123. Adding any reactant or product to a system at equilibrium will shift the equilibrium away from the added substance.

124. Removing any reactant or product from a system at equilibrium will shift the equilibrium point toward that removed substance. 125. An increase in temperature shifts an equilibrium system in the endothermic direction.

126. A decrease in temperature shifts an equilibrium system in the exothermic direction.

127. Increasing the pressure on a gaseous equilibrium will shift the equilibrium point toward the side with fewer moles of gas.

128. Decreasing the pressure on a gaseous equilibrium will shift the equilibrium point toward the side with more moles of gas.

129. Catalysts have no effect on an equilibrium. It just establishes itself quicker.

130. Enthalpy (H) is the heat energy gained or lost in a reaction.

131. Entropy (S) is high in a highly unorganized system, such as a gas, a messy room, etc