Name: ___________________________________ **Date:** ________

Chemistry *~ Ms. Hart* **Class:** Anions or Cations

7.1 Rate of Reactions – Collision Theory - Homework

1. In order for a chemical reaction to occur, there must always be
   (1) an effective collision between reacting particles
   (2) a bond that breaks in a reactant particle
   (3) reacting particles with a high charge
   (4) reacting particles with high kinetic energy

2. As the number of effective collisions between reacting particles increases, the rate of reaction
   (1) decreases
   (2) increases
   (3) remains the same
   (4) changes the orientation of the particles

3. In a chemical reaction, as the concentrations of the reacting particles increase, the rate of reactions generally
   (1) decreases
   (2) increases
   (3) remains the same
   (4) reaches equilibrium

4. Which conditions will increase the rate of a chemical reaction?
   (1) decreased temperature and decreased concentration of reactants
   (2) decreased temperature and increased concentration of reactants
   (3) increased temperature and decreased concentration of reactants
   (4) increased temperature and increased concentration of reactants

5. Explain why a crushed solid reacts with a gas more quickly than a large chunk of the same solid.

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6. Apply collision theory to explain why foods usually spoil more slowly when refrigerated than at room temperature.

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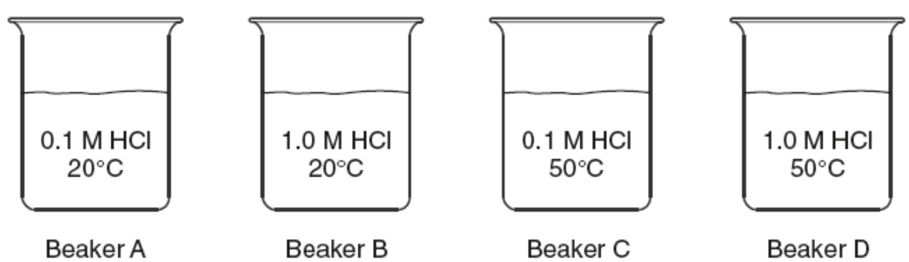
7. In each of the four beakers shown below, a 2.0-centimeter strip of magnesium ribbon reacts with 100 milliliters of HCl(aq) under the conditions shown. (M = how concentrated something is)



In which beaker will the reaction occur at the fastest rate?
(1) A (2) B (3) C (4)

8. According to the collision theory, what are the requirements for a reaction to occur?

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9. A 1-cubic-centimeter cube of sodium reacts more rapidly in water at 25°C than does a 1-cubic-centimeter cube of calcium at 25°C. This difference in rate of reaction is most closely associated with the different
   a. surface areas of the metal cubes.
   b. natures of the metals.
   c. densities of the metals.
   d. concentrations of the metals.
10. When a catalyst is added to a chemical reaction, there is a change in the
    a. Heat of reaction
    b. Rate of reaction
    c. Potential energy of the reactants
    d. Potential energy of the products
11. Raising the temperature speeds up the rate of a chemical reaction by increasing
    a. The effectiveness of the collisions, only
    b. The frequency of the collisions, only
    c. Both the effectiveness and the frequency of the collisions
    d. Neither the effectiveness nor the frequency of the collisions
12. Given the reaction: $A + B \rightarrow C + D$; The reaction will most likely occur at the greatest rate if A and B represent
    a. Nonpolar molecular compounds in the solid phase
    b. Ionic compounds in the solid phase
    c. Solutions of nonpolar molecular compounds
    d. Solutions of ionic compounds

Explain your answer:

13. A student adds two 50-mg pieces of Ca(s) to water. A reaction takes place according to the following equation:

$$Ca(s) + 2H_2O(l) \rightarrow Ca(OH)_2(aq) + H_2(g)$$

Which change could the student have made that would most likely have increased the rate of the reaction?
    a. Used ten 10-mg pieces of Ca(s)
    b. Used one 100-mg piece of Ca(s)
    c. Decreased the amount of the water
    d. Decreased the temperature of the water

Explain your answer:

14. In order for a chemical reaction to occur, there must always be
    a. An effective collision between reacting particles
    b. A bond that breaks in a reactant particle
    c. Reacting particles with a high charge
    d. Reacting particles with a high kinetic energy

Explain your answer:

15. At room temperature, which reaction would be expected to have the fastest reaction rate?
    a. $Pb^{2+}(aq) + S^{2-}(aq) \rightarrow PbS(s)$
    b. $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$
    c. $N_2(g) + 2O_2(g) \rightarrow 2NO_2(g)$
    d. $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$

Explain your answer: