Reaction Rate 2 HW Q1-14

1) As the number of effective collisions between reacting particles increases, the rate of a chemical reaction

A) decreases B) increases C) remains the same

2) Given the reaction:

$$CuSO_4(s) \rightleftharpoons C^{2+}(aq) + SO_4^{2-}(aq)$$

The $CuSO_4(s)$ dissolves more rapidly when it is powdered because the increased surface area due to powdering permits

A) the equilibrium to shift to the right
B) increased solute solubility
C) the equilibrium to shift to the left
D) increased solvent contact

3) Given the reaction:

$$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$$

The reaction occurs more rapidly when a 10-gram sample of Mg is powdered, rather than in one piece, because powdered Mg has

A) a lower potential energy
B) more surface area
C) a higher potential energy
D) less surface area

4) Under which conditions will the rate of a chemical reaction always decrease?

A) The concentration of the reactants increases, and the temperature decreases.
B) The concentration of the reactants increases, and the temperature increases.
C) The concentration of the reactants decreases, and the temperature increases.
D) The concentration of the reactants decreases, and the temperature decreases.

5) Given the reaction:

$$A(g) + B(g) \longrightarrow C(g)$$

As the concentration of $A(g)$ increases, the frequency of collisions of $A(g)$ with $B(g)$

A) increases B) decreases C) remains the same

6) Charcoal reacts with oxygen according to the equation $C(s) + O_2(g) \longrightarrow CO_2(g)$. Which of the following changes would cause the *greatest* increase in the rate of reaction?

A) decreasing the pressure of $O_2(g)$
B) using charcoal in lump form
C) using charcoal in powdered form
D) decreasing the concentration of $O_2(g)$

Questions 7 and 8 refer to the following:

The table below records the production of 50 milliliters of CO_2 in the reaction of HCl with $NaHCO_3$. Five trials were performed under different conditions as shown. (The same mass of $NaHCO_3$ was used in each trial.)

Trial	Particle Size of $NaHCO_3$	Concentration of HCl	Temperature (°C) of HCl
A	small	1 M	20
B	large	1 M	20
C	large	1 M	40
D	small	2 M	40
E	large	2 M	40

7a) Which two trials could be used to measure the effect of surface area?

A) trials *A* and *B* B) trials *B* and *D* C) trials *A* and *D* D) trials *A* and *C*

7b) Which two trials could be used to measure the effect of concentration ?

A) trials *A* and *B* B) trials *B* and *D* C) trials C and E D) trials *A* and *C*

7c) Which two trials could be used to measure the effect of temperature ?

A) trials *A* and *B* B) trials *B* and *D* C) trials C and E D) trials *B* and *C*

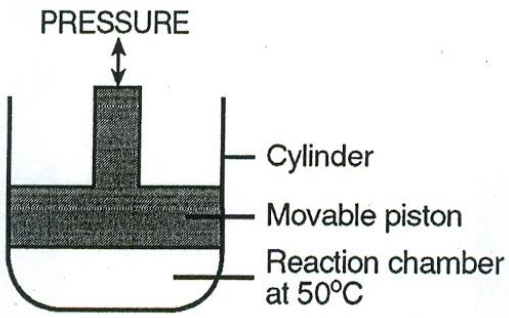
8) Which trial would produce the *fastest* reaction?

A) trial *A* B) trial *B* C) trial *D* D) trial *C*

9) An increase in the temperature increases the rate of a chemical reaction because the collisions in this reaction increase in

A) effectiveness, only
B) neither number nor effectiveness
C) number, only
D) both number and effectiveness

10) The reaction $A(g) + B(g) \longrightarrow C(g)$ is occurring in the apparatus shown below.



The rate of reaction can be decreased by increasing the

A) concentration of reactant $A(g)$
B) pressure on the reactants
C) volume of the reaction chamber
D) temperature of the reactants

11) Given the reaction at equilibrium:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

Increasing the concentration of $N_2(g)$ will increase the forward reaction rate due to

A) a decrease in the number of effective collisions
B) an increase in the activation energy
C) a decrease in the activation energy
D) an increase in the number of effective collisions

12) Four aluminum samples are each reacted with separate 1 M copper sulfate solutions under the same conditions of temperature and pressure. Which aluminum sample would react *most* rapidly?

A) 1-gram bar of Al
B) 1 gram of Al pellets
C) 1 gram of Al powder
D) 1 gram of Al ribbon

13) Given the reaction:

$$Mg(s) + 2H_2O(\ell) \rightarrow Mg(OH)_2(s) + H_2(g)$$

For the reaction to occur at the *greatest* rate, 1 gram of Mg(s) should be added in the form of

A) a powder B) a ribbon C) small chunks D) large chunks

14) Which event must *always* occur for a chemical reaction to take place?

A) addition of a catalyst to the reaction system
B) effective collisions between reacting particles
C) formation of a gas
D) formation of a precipitate