Chem12 Kinetics : Quiz 1-60

1) Consider the following :

    i) frequency of successful collisions
    ii) volume of the reaction vessel
    iii) pressure of the system
    iv) mass of the system

To increase the rate of a reaction, there must be an increase in :

    a) I only   b) I and III only
    c) I, II and IV only   d) I, II, III and IV

2) Which of the following factors affects the rate of heterogeneous reactions only ?

    a) Presence of a catalyst
    b) Temperature of reactants
    c) Surface area of reactants
    d) Concentration of reactants

3) Consider the following reaction :

    $CaCO_3(s) + 2HCl(aq) \rightarrow CO_2(g) + CaCl_2(aq) + H_2O(l)$

    In which of the following will **BOTH** of the described procedures cause an increase in the rate at which products are formed.

    a) Increase [HCl] and decrease pressure
    b) Increase [HCl] and increase temperature
    c) Increase [HCl] and decrease temperature
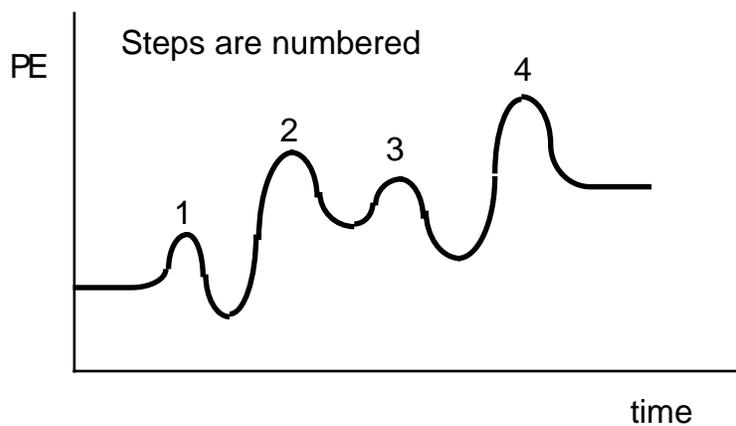   d) Grind up the $CaCO_3$ and decrease temperature

4) Use the potential energy diagram below to answer question 4.
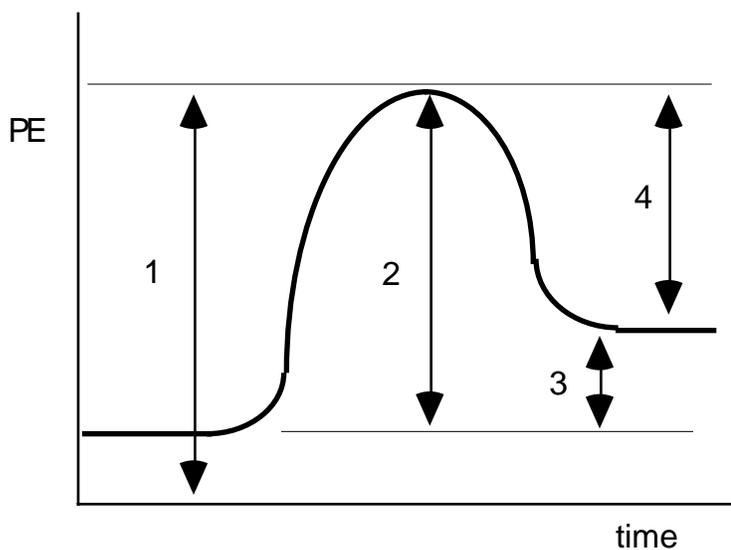
Which interval in the above potential energy diagram represents the activation energy for the forward reaction ?

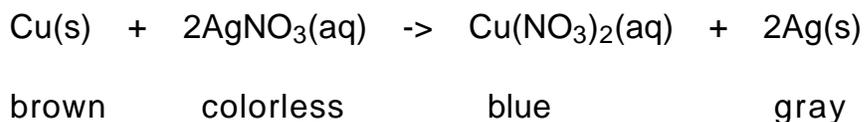a) 1   b) 2   c) 3   d) 4

5) Use the potential energy diagram below to answer question 5.

The above energy diagram represents a four-step reaction mechanism. Which is the rate determining step ?

a) 1   b) 2   c) 3   d) 4

6) The following equation represents the reaction between copper metal and aqueous silver nitrate solution :

$$Cu(s) \ + \ 2AgNO_3(aq) \ \text{->} \ Cu(NO_3)_2(aq) \ + \ 2Ag(s)$$

brown   colorless   blue   gray

Which of the following properties would **BEST** monitor the rate of this reaction ?

    a) Concentration of $NO_3^-(aq)$ b) Gas pressure
    c) Color of the solution   d) Mass of the system

7) Which of the following reactions would be expected to have the fastest rate at room temperature ?

    a) $Hg(l) + Br_2(l) \ \text{->} \ HgBr_2(s)$
    b) $2H_2(g) + O_2(g) \ \text{->} \ 2H_2O(g)$
    c) $Ag^{2+}(aq) + Cl^-(aq) \ \text{->} \ AgCl(s)$
   d) $4NH_3(g) + 7O_2(g) \ \text{->} \ 4NO_2(g) + 6H_2O(g)$

8) The effect of a catalyst is thought to be due to

    a) an increase in reactant kinetic energy
    b) the addition of a low energy path for a reaction
    c) the removal of a high energy path for the reaction
    d) a decrease in the number of steps in a reaction mechanism

9) A two step reaction mechanism has at least :

    a) one reaction intermediate and one activated complex.
    b) two reaction intermediates and one activated complex.
    c) one reaction intermediate and two activated complexes.
    d) two reaction intermediates and two activated complexes.

10) A reaction has the following mechanism :

    $2NO \ \text{->} \ N_2O_2$
    $N_2O_2 + H_2 \ \text{->} \ N_2O + H_2O$
    $N_2O + H_2 \ \text{->} \ N_2 + H_2O$
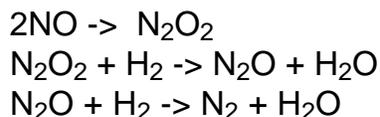
    Give the NET overall reaction.

Answers : 1) a, 2) c, 3) b, 4) b, 5) d, 6) c, 7) c, 8) b, 9) c,
10) 2 NO + 2 H$_2$ -> N$_2$ + 2 H$_2$O.