DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 10

Topic :- Chemical Kinetics

1. The activation energies of two reactions are E_1 and $E_2(E_1 > E_2)$. If the temperature of the system is increased from T_1 to T_2, the rate constant of the reactions changes from k_1 to k_1 in the first reaction and k_2 and k_2 in the second reaction. Predict which of the following expression is correct?

a) $\frac{k_1'}{k_1'} = \frac{k_2'}{k_2'}$ b) $\frac{k_1'}{k_1'} > \frac{k_2'}{k_2'}$ c) $\frac{k_1'}{k_1'} < \frac{k_2'}{k_2'}$ d) $\frac{k_1'}{k_1'} = \frac{k_2'}{k_2'} = 1$

2. Effective collisions are those in which molecules must:
a) Have energy equal to or greater than the threshold energy
b) Have proper orientation
c) Acquire the energy of activation
d) All of the above

3. Consider the following statements,
The rate law for the acid catalysed hydrolysis of an ester being given as $Rate = k[H^+][ester] = k'[ester]$.
If the acid concentration is doubled at constant ester concentration
1. The second order rate constant, k is doubled.
2. The pseudo first order rate constant, k is double.
3. The rate of the reaction is doubled.
Which of the above statements are correct?
a) 1 and 2 b) 2 and 3 c) 1 and 3 d) 1,2 and 3

4. Half-life of two samples is 0.1 and 0.8 s. Their respective concentration is 400 and 50 respectively.
The order of reaction is
a) 0 b) 2 c) 1 d) 4

5. The units of rate of reaction are
a) L mol^{-1} s^{-1} b) mol L^{-1} s^{-1} c) mol s^{-1} d) None of these

6. Units of rate constant of first and zero order reactions in terms of molarity M unit are respectively
a) s^{-1}, M s^{-1} b) s^{-1}, M c) M s^{-1}, s^{-1} d) M, s^{-1}

7. The half time of a second order reaction is:
a) Inversely proportional to the square of the initial concentration of the reactants
b) Inversely proportional to the initial concentration of the reactants
c) Proportional to the initial concentration of reactants
d) Independent of the initial concentration of reactants

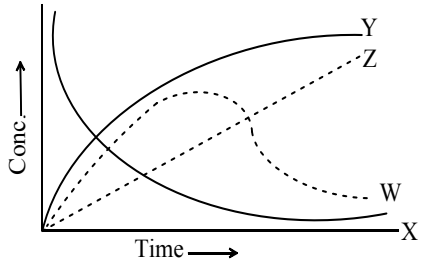
8. $\frac{1}{[A]^2}$vs times are a straight line. Order of reaction is
a) First b) Second c) Zero d) Third

9. For an endothermic reaction where, ΔH represents the enthalpy of the reaction in kJ/mol, the minimum value for the energy of activation will be
a) Less than ΔH b) Zero c) More than ΔH d) Equal to ΔH

10. The unit of rate constant for a zero order reaction
a) L s^{-1} b) L mol^{-1} s^{-1} c) mol L^{-1} s^{-1} d) mol s^{-1}

11. What is the formula to find value of $t_{1/2}$ for a zero order reaction?
a) $\frac{k}{[R]_0}$ b) $\frac{2k}{[R]_0}$ c) $\frac{[R]_0}{2k}$ d) $\frac{0.693}{k}$

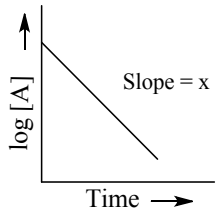
12. For the reaction, $A + B \longrightarrow C + D$. The variation of the concentration of the products is given by the curve:



a) X b) Y c) Z d) W

13. Acid hydrolysis of sucrose is a
a) Pseudo first order reaction b) Zero order reaction
c) Second order reaction d) Unimolecular reaction

14. For a first order reaction the graph log $[A] vs\ t$ is given below



x is equal to

a) $\frac{0.693}{k}$ b) $\frac{k}{2.303}$ c) $-\frac{k}{2.303}$ d) $\log\ [A]_0$

15. The rate constant of a first order reaction is $4 \times 10^{-3}\text{sec}^{-1}$. At a reactant concentration of 0.02 M, the rate of reaction would be:

a) $8 \times 10^{-5}\ M\ \text{sec}^{-1}$ b) $4 \times 10^{-3}\ M\ \text{sec}^{-1}$ c) $2 \times 10^{-1}\ M\ \text{sec}^{-1}$ d) $4 \times 10^{-1}\ M\ \text{sec}^{-1}$

16. The rate constant for the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$ is $3.0 \times 10^{-5} s^{-1}$. If the rate is 2.4×10^{-5} $molL^{-1}s^{-1}$ then the concentration of $N_2O_5 (in\ mol\ L^{-1})$ is

a) 0.04 b) 0.8 c) 0.07 d) 1.4

17. Activation energy of a reaction is:

a) The energy released during the reaction
b) The energy evolved when activated complex is formed
c) Minimum amount of energy needed to overcome the potential barrier of reaction
d) The energy needed to form one mole of the product

18. The activation energy for a reaction is 9.0 Kcal/mol. The increase in the rate constant when its temperature is increased from 298 K to 308 K is:

a) 10% b) 100% c) 50% d) 63%

19. The rate of first order reaction, $A \longrightarrow$ Products, is $7.5 \times 10^{-4}\text{mol litre}^{-1}\text{sec}^{-1}$. If the concentration of A is 0.5 mol litre^{-1} the rate constant is:

a) $3.75 \times 10^{-4}\text{sec}^{-1}$ b) $2.5 \times 10^{-5}\text{sec}^{-1}$ c) $1.5 \times 10^{-3}\text{sec}^{-1}$ d) $8.0 \times 10^{-4}\text{sec}^{-1}$

20. $2N_2O_5 \rightleftharpoons 4NO_2 + O_2$

For the above reaction which of the following is not correct above rates of reaction?

a) $\frac{-d[N_2O_5]}{dt} = 2\frac{d[O_2]}{dt}$ b) $\frac{-2d[N_2O_5]}{dt} = \frac{d[NO_2]}{dt}$

c) $\frac{d[NO_5]}{dt} = 4\frac{d[O_2]}{dt}$ d) $\frac{-2d[N_2O_5]}{dt} = 4\frac{d[NO_2]}{dt} = \frac{d[O_2]}{dt}$