



CHEMISTRY

CH: 4 KINETICS

Class: XII

- I
- Answer the following
1. Define the following for a chemical reaction. a) order b) half life c) pseudo first order reaction d) effective collision f) threshold energy
 2. For the reaction $A \rightarrow B$ the rate of reaction becomes 3 times when the concentration of A is increased 27 times. What is the order of reaction?
 3. A first order reaction has a specific reaction rate of $10^{-3}/s$. How long will it take for 10 g of the reactant to be reduced to 2.5 g?
 4. For a reaction $X_2 + 2Y_2 \rightarrow 2XY_2$, write the rate equation in terms of rate of disappearance of Y_2
 5. For the reaction $2H_2 + 2NO \rightarrow N_2 + 2H_2O$, the rate law is expressed as rate $k = [H_2][NO]^2$. Write the overall order of reaction.
 6. The decomposition reaction $4PH_3 \rightarrow P_4 + 6H_2$ has the rate law $R = k[PH_3]$. Rate constant is $6 \times 10^{-4}/s$ at $27^\circ C$. $E_a = 3.05 \times 10^5 J/mole$. Find the rate constant at $37^\circ C$?
 8. The half life of a reaction $N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$ is 2.4 hrs.
 - a) Starting with 100 g of N_2O_5 , how much would remain after a period of 9.6 hrs?
 - b) What time would be required to reduce 10^5 molecules of N_2O_5 to 10^3 molecules?
 9. The decomposition of hydrocarbons follows $k = 4.5 \times 10^{11}/s e^{-28000k/T}$, calculate E_a .
 10. In some cases it is found that a large number of colliding molecules have energy more than threshold value, yet the reaction is slow. Why?
 11. What is the effect of catalyst on reaction rate and activation energy?
 12. The activation energy of a reaction is 94.14 kJ/mol and the value of rate constant at 313 K is $1.8 \times 10^{-5} s^{-1}$. Calculate the frequency factor.
 13. For a reaction energy of activation is zero. What is the value of Arrhenius constant at 300 K if $k = 1.6 \times 10^6 s^{-1}$?
 14. A first order reaction is 20 % complete in 20 minutes. Calculate the time taken for the reaction to complete 80%.