

Chemical Kinetics

1. What is the value of rate constant of a first order reaction when its half life period is 10 min?
- 2 . Comment on the following statements : (i) Three and more than three body collisions are rare.
(ii) Slowest step in the mechanism of a reaction determines the rate of a reaction.
(iii) The reaction rate doubles it self for every 10°C rise in temperature while the number of collisions do not increase so much.
3. What is meant by order of a chemical reaction? The reaction:
$$2\text{NO}_2 + \text{F}_2 \rightarrow 2\text{NO}_2\text{F}$$
has been found to be first order with respect to NO, and with respect to F₂.
(i) Write the rate law equation for the reaction.
(ii) What is the over all order of the reaction?
(iii) Suggest a suitable mechanism for the reaction.
4. Explain with examples the meaning of the terms average rate and instantaneous rate of the reaction-
5. What is order of a reaction? Name three methods to determine the order of a reaction. Explain any one method in detail.
6. Give four differences between rate of a reaction and rate constant.
7. Distinguish between order of a reaction and molecularity.
8. Write three differences between average rate of reaction and instantaneous rate of reaction.
9. What is half life period? Derive an expression for half Life period in case of zero and first order reaction.

Long answer types

10. What do you understand by order of a reaction ? Give one example each of a first and second order reaction. How does order of a reaction differ from molecularity?
11. Discuss briefly the effect of temperature on reaction rates.
12. What is Arrhenius equation to describe the effect of temperature on rate of a reaction?
13. Derive the integrated form of rate equation for the first order reaction. How can the integrated rate equation be used for calculation of rate constant?
14. Explain the following terms :
 - (i) Rate of a reaction
 - (ii) Activation energy of a reaction.