

Physical Chemistry

3G (Chemical Kinetics)

- 1) What is rate of a reaction? What is the unit of the rate of the reaction?
- 2) Write the rate expression of the followings wrt reactant and product –
 - (i) $\text{N}_2 + 3\text{H}_2 = 2\text{NH}_3$
 - (ii) $\text{PCl}_5 = \text{PCl}_3 + \text{Cl}_2$
 - (iii) $a\text{A} + b\text{B} = c\text{C} + d\text{D}$
- 3) What is average rate and instantaneous rate of the reaction? Write the difference between them.
- 4) What are the factors that influence the rate of the reaction?
- 5) What is rate law equation?
- 6) Write the differences between rate and rate constant of a reaction.
- 7) What is order and molecularity of a reaction? Write the difference between them.
- 8) Explain why molecularity more than three is rare or uncommon.
- 9) Explain the differential and integral form of zero order reaction.
- 10) Give two example of zero order reaction.
- 11) What is half life of a reaction?
- 12) Determine the half life period of zero order reaction.
- 13) Write the unite of rate constant for zero order, first order, second order, third order reaction.
- 14) For zero order reaction, draw the graph of the followings –
 - (i) [Product] vs Time
 - (ii) Rate vs [Reactant]
 - (iii) [Reactant] vs time
 - (iv) Half life vs [Initial concentration of the reactant]
- 15) Explain the differential and integral form of first order reaction.
- 16) Give two example of first order reaction.
- 17) Determine the half life period of first order reaction.
- 18) For first order reaction, draw the graph of the followings –
 - (i) $\text{Log}(\text{A})$ vs Time
 - (ii) $\text{Log}(\text{A}^0/\text{A})$ vs time
 - (iii) Half life vs [Initial concentration of the reactant]
- 19) What is Pseudo first order reaction? Give example.
- 20) Explain the differential and integral form of second order reaction when (i) Reactant have same initial concentration, (ii) When reactants have different initial concentration.
- 21) Determine the half life period of second order reaction.
- 22) Express the half life of reaction of nth order reaction.
- 23) How do you determine the order of a reaction by (i) Half life method, (ii) Van't Hoff method.
- 24) What is temperature coefficient?
- 25) Define Activation energy?
- 26) How rate constant related with temperature?
- 27) Express Arrhenius equation with two different temperatures.
- 28) For a second order reaction $2\text{A} \rightarrow \text{P}$, the half life is $t_{1/2}$ and the initial concentration of the reaction is 'a'. Find the relation between $t_{1/2}$ and 'a'
- 29) A first order reaction goes to completion in 50 minutes, How long will it take for 80% completion?
- 30) The value of rate constant of a first order reaction is $7 \times 10^{-3} \text{S}^{-1}$. How long will it take for 75% completion?
- 31) Hydrolysis of cane sugar is a pseudo unimolecular reaction – Explain.
- 32) Show that half life of a first order reaction does not depends on the initial concentration of the reactant.