

CHEMICAL KINETICS

1. The rate of a reaction depends on:

- A) Temperature only
- B) Pressure only
- C) Concentration of reactants
- D) All of the above

2. For a zero-order reaction, the rate of reaction is:

- A) Proportional to concentration
- B) Independent of concentration
- C) Inversely proportional to concentration
- D) Proportional to the square of concentration

3. The unit of rate constant for a first-order reaction is:

- A) $\text{mol L}^{-1} \text{s}^{-1}$
- B) s^{-1}
- C) $\text{L mol}^{-1} \text{s}^{-1}$
- D) $\text{mol}^2 \text{L}^{-2} \text{s}^{-1}$

4. A plot of $\log [A]$ vs. time gives a straight line for:

- A) Zero-order reaction
- B) First-order reaction
- C) Second-order reaction
- D) Third-order reaction

5. In the Arrhenius equation, $k = Ae^{-E_a/RT}$, what does E_a represent?

- A) Energy released
- B) Energy of products
- C) Activation energy
- D) Threshold energy

6. The half-life of a first-order reaction depends on:

- A) Initial concentration
- B) Temperature
- C) Catalyst
- D) Rate constant

7. The rate constant doubles when temperature increases from 300 K to 310 K. The activation energy is approximately:

- A) 50 kJ/mol
- B) 57 kJ/mol
- C) 66 kJ/mol
- D) 69 kJ/mol

8. For a reaction $A \rightarrow B$, the rate law is $\text{rate} = k[A]^2$. If $[A]$ is halved, the rate becomes:

- A) One-fourth
- B) Half

- C) Double
- D) Same

9. The slope of a straight line in a first-order reaction graph ($\log [A]$ vs time) is:

- A) $-k$
- B) -0.693
- C) $-k/2.303$
- D) $-2.303k$

10. Which factor does not affect the rate of a chemical reaction?

- A) Catalyst
- B) Surface area
- C) Nature of products
- D) Temperature

11. The rate law for the reaction $2A + B \rightarrow \text{Products}$ is $\text{rate} = k[A]^2[B]$. What is the overall order of the reaction?

- A) 1
- B) 2
- C) 3
- D) 4

12. A reaction is said to be of second order if:

- A) $\text{Rate} \propto [A]^2$
- B) $\text{Rate} \propto [A][B]$
- C) $\text{Rate} \propto [A]$
- D) Both A and B

13. For a zero-order reaction, a plot of concentration $[A]$ vs time is:

- A) A straight line
- B) A parabola
- C) A hyperbola
- D) Exponential

14. Half-life of a second-order reaction is:

- A) Independent of $[A]_0$
- B) Inversely proportional to $[A]_0$
- C) Directly proportional to $[A]_0$
- D) Proportional to the square of $[A]_0$

15. If the rate of a reaction becomes 8 times when concentration is doubled, the order with respect to that reactant is:

- A) 2
- B) 3
- C) 4
- D) 8

16. In a reaction, the rate law is $\text{rate} = k[A][B]$. Doubling $[A]$ and tripling $[B]$ will increase the rate by:

- A) 2 times
- B) 3 times

- C) 5 times
- D) 6 times

17. Which of the following will not increase the rate of a chemical reaction?

- A) Increasing temperature
- B) Adding a catalyst
- C) Increasing pressure (for gases)
- D) Increasing product concentration

18. Activation energy of a reaction can be calculated from:

- A) Van't Hoff equation
- B) Gibbs free energy equation
- C) Arrhenius equation
- D) Raoult's law

19. The rate of a reaction is determined by:

- A) Fastest step
- B) Slowest step
- C) Any step
- D) Intermediate step

20. Which graph is linear for a first-order reaction?

- A) [A] vs t
- B) $1/[A]$ vs t
- C) $\log [A]$ vs t
- D) $\ln [A]$ vs $1/T$

ANSWERS-1.(D) 2.(B) 3.(B) 4.(B) 5.(C) 6.(D) 7.(D) 8.(A) 9.(C) 10.(C) 11.(C) 12.(D) 13.(A)

14.(B) 15.(C) 16.(D) 17.(D) 18.(C) 19.(B) 20.(C)