

Class : XIIth
Date :

Subject : CHEMISTRY
DPP No. : 4

Topic :- Chemical Kinetics

- For a first order reaction, $(A) \rightarrow$ products, the concentration of A changes from 0.1 M to 0.025 M in 40 minutes. The rate of reaction when the concentration of A is 0.01 M, is:
 - 3.47×10^{-4} M/min
 - 3.47×10^{-5} M/min
 - 1.73×10^{-4} M/min
 - 1.73×10^{-5} M/min
- In a 1st order reaction, reactant concentration C varies with time t as
 - 1/C increases linearly with t
 - Log C decreases linearly with t
 - C decreases with 1/t
 - Log C decreases with 1/t
- The rate constant of a zero order reaction is $0.2 \text{ mol dm}^{-3} \text{ h}^{-1}$. If the concentration of the reactant after 30 min is 0.05 mol dm^{-3} . Then its initial concentration would be
 - 0.01 mol dm^{-3}
 - 0.15 mol dm^{-3}
 - 0.25 mol dm^{-3}
 - 4.00 mol dm^{-3}
- For a chemical reaction $2X + Y \rightarrow Z$, the rate of appearance of Z is 0.05 mol L^{-1} . The rate of disappearance of X will be
 - $0.05 \text{ mol L}^{-1} \text{ h}^{-1}$
 - $0.05 \text{ mol L}^{-1} \text{ min}^{-1}$
 - $0.1 \text{ mol L}^{-1} \text{ min}^{-1}$
 - $0.25 \text{ mol L}^{-1} \text{ min}^{-1}$
- For a reaction, $x(g) \rightarrow y(g) + z(g)$ the half-life period is 10 min. in what period of time would the concentration of X be reduce to 10% of original concentration?
 - 20 min
 - 33 min
 - 15 min
 - 25 min
- When is the activation energy for the decomposition of N_2O_5 as,

$$\text{N}_2\text{O}_5 \rightleftharpoons 2\text{NO}_2 + \frac{1}{2}\text{O}_2$$
 If the values of rate constant = 3.45×10^{-5} at 27°C and rate constant = 6.9×10^{-3} at 67°C?
 - 112.5 kJ
 - 200 kJ
 - 149.5 kJ
 - 11.25 kJ
- Rate equation for a second order reaction is:
 - $K = \frac{2.303}{t} \log \frac{a}{(a-x)}$
 - $K = \frac{1}{t} \log \frac{a}{a(a-x)}$
 - $K = \frac{1}{t} \cdot \frac{x}{a(a-x)}$
 - $K = \frac{1}{t^2} \cdot \frac{a}{(a-x)}$
- Which of the following statements are correct?

- Order of a reaction can be known from experimental result and not from the stoichiometry of reaction
- Overall molecularity of a reaction may be determined in a manner similar to overall order of reaction
- Overall order of reaction,
 $A^m + B^n \rightarrow AB_x$ is $(m + n)$
- Molecularity of a reaction refers to
 - Molecularity of each of the elementary steps (slow steps) in a multistep reaction
 - Molecularity of that particular step in a single step reaction

Select the correct answer by using the codes given below

- a) 1, 3 and 4 b) 1, 2 and 3 c) 2, 3 and 4 d) 1, 2 and 4
9. For the order reaction with rate constant 'K' and initial concentration 'a', the half-life period given by
- a) $\frac{1n2}{k}$ b) $\frac{1}{ka}$ c) $\frac{3}{2k.a^2}$ d) None of these
10. For the reaction, $2A + B \rightarrow C + D$, the order of reaction is
- a) One with respect[B] b) Two with respect to [A]
 c) Three d) Cannot be predicted
11. Which expression is wrong for first order reaction?
- a) $k = \frac{2.303}{t} \log \left(\frac{A_0}{A_t} \right)$ b) $k = \frac{t}{2.303} \log \left(\frac{A_0}{A_t} \right)$
 c) $-k = \frac{t}{2.303} \log \left(\frac{A_t}{A_0} \right)$ d) Rate = k[A]
12. For a first order reaction, the half-life period is
- a) Dependent on the square of the initial concentration.
 b) Dependent on first power of initial concentration.
 c) Dependent on the square root of initial concentration.
 d) Independent on initial concentration
13. Give relation between half reaction time ($t_{1/2}$) and initial concentration of reactant for $(n - 1)$ order reaction.
- a) $t_{1/2} \propto [R]_0$ b) $t_{1/2} \propto [R]_0^{2-n}$ c) $t_{1/2} \propto [R]_0^{n+1}$ d) $t_{1/2} \propto [R]_0^{n-2}$

14. For a first order reaction $A \rightarrow \text{Product}$, the initial concentration of A is $0.1 M$ and after 40 minute it becomes $0.025 M$. Calculate the rate of reaction at reactant concentration of $0.01M$:
- $3.47 \times 10^{-4} M \text{ min}^{-1}$
 - $3.47 \times 10^{-5} M \text{ min}^{-1}$
 - $1.735 \times 10^{-6} M \text{ min}^{-1}$
 - $1.735 \times 10^{-4} M \text{ min}^{-1}$
15. Rate of reaction
- Decreases with increase in temperature
 - Increases with increase in temperature
 - May increase or decrease with increase in temperature
 - Does not depends on temperature
16. For the first order reaction with the rate constant k , which expression gives the rate half-life period? (Initial conc. = a)
- $\frac{3}{2} ka^2$
 - $\frac{1}{ka}$
 - $\frac{1}{k}$
 - $\frac{0.693}{k}$
17. The rate constant (k') of one of the reaction is found to be double that of the rate constant (k'') of another reaction. Then the relationship between the corresponding activation energies of the two reaction (E'_a and E''_a) can be represented as
- $E'_a > E''_a$
 - $E'_a = 4E''_a$
 - $E'_a = E''_a$
 - $E'_a < E''_a$
18. For a given reaction of first order, it takes 15 minute for the concentration to drop from $0.8 M \text{ litre}^{-1}$ to $0.4 M \text{ litre}^{-1}$. The time required for the concentration to drop from $0.1 M \text{ litre}^{-1}$ to $0.025 M \text{ litre}^{-1}$ will be:
- 60 minute
 - 15 minute
 - 7.5 minute
 - 30 minute
19. The rate constant for a second order reaction is $8 \times 10^{-5} M^{-1} \text{ min}^{-1}$. How long will it take a $1M$ solution to be reduced to $0.5M$?
- $8.665 \times 10^3 \text{ minute}$
 - $8 \times 10^{-5} \text{ minute}$
 - $1.25 \times 10^4 \text{ minute}$
 - $4 \times 10^{-5} \text{ minute}$
20. The slope in Arrhenius plot, is equal to
- $-\frac{E_a}{2.303 R}$
 - $\frac{E_a}{R}$
 - $-\frac{R}{2.303 E_a}$
 - None of the above