

Class : XII<sup>th</sup>

Date :

Subject : CHEMISTRY

DPP No. : 2

## Topic :- Chemical Kinetics

- The velocity constant of a reaction at 290 K was found to be  $3.2 \times 10^{-3}$  at 300 K, it will be  
a)  $6.4 \times 10^{-3}$       b)  $1.28 \times 10^{-2}$       c)  $9.6 \times 10^{-3}$       d)  $3.2 \times 10^{-4}$
- The term  $\frac{-dc}{dt}$  in a rate equation refers to  
a) The decrease in concentration of the reactant with time  
b) The concentration of the reactant  
c) The change in concentration of the reactant  
d) The velocity constant of the reaction
- In a first order reaction the concentration of reactant decreases from  $800 \text{ mol/dm}^6$  to  $50 \text{ mol/dm}^6$  in  $2 \times 10^4$  s. The rate constant of reaction in  $\text{s}^{-1}$  is  
a)  $2 \times 10^4$       b)  $3.45 \times 10^{-5}$       c)  $1.386 \times 10^{-4}$       d)  $2 \times 10^{-4}$
- Consider the chemical reaction,  
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$   
The rate of this reaction can be expressed in terms of time derivative of concentration of  $\text{N}_2(\text{g})$ ,  $\text{H}_2(\text{g})$  and  $\text{NH}_3(\text{g})$ . Identify the correct relationship amongst the rate expressions:  
a)  $\text{Rate} = -d[\text{N}_2]/dt = -\frac{1}{3} d[\text{H}_2]/dt = \frac{1}{2} d[\text{NH}_3]/dt$   
b)  $\text{Rate} = -d[\text{N}_2]/dt = -3d[\text{H}_2]/dt = 2d[\text{NH}_3]/dt$   
c)  $\text{Rate} = d[\text{N}_2]/dt = \frac{1}{3} d[\text{H}_2]/dt = \frac{1}{2} d[\text{NH}_3]/dt$   
d)  $\text{Rate} = -d[\text{N}_2]/dt = -d[\text{H}_2]/dt = d[\text{NH}_3]/dt$
- Rate of reaction can be expressed by following rate expression,  $\text{rate} = k[\text{A}]^2[\text{B}]$ , if concentration of A is increased by 3 times and concentration of B is increased by 2 times, how many times rate of reaction increases?  
a) 9 times      b) 27 times      c) 18 times      d) 8 times
- As the reaction progresses, the rate of reaction  
a) Increases      b) Decreases  
c) Remains constant      d) First increases, then decreases

7. The data for the reaction,  $A+B \rightarrow C$

Ex	$[A]_0$	$[B]_0$	Initial rate
1	0.012	0.035	0.10
2	0.024	0.070	0.80
3	0.024	0.035	0.10
4	0.012	0.070	0.80

The rate law corresponds to the above data is

- a)  $rate = k[B]^3$       b)  $rate = k[B]^4$       c)  $rate = k[A][B]^3$       d)  $rate = k[A]^2[B]^2$
8. In a reaction, when the concentration of reactant is increased two times, the increase in rate of reaction was four times. Order of reaction is
- a) Zero      b) 1      c) 2      d) 3
9. For the reaction  
 $N_2 + 3H_2 \rightleftharpoons 2NH_3$   
The rate of change of concentration for hydrogen is  $0.3 \times 10^{-4} Ms^{-1}$   
The rates of change of concentration of ammonia is
- a)  $-0.2 \times 10^{-4}$       b)  $0.2 \times 10^{-4}$       c)  $0.1 \times 10^{-4}$       d)  $0.3 \times 10^{-4}$
10. Which of the following statement is in accordance with collision theory?  
Rate is directly proportional to collision frequency  
Rate depend upon orientation of atoms  
Temperature determines the rate
- a) Only III      b) Only I and II  
c) Only II and III      d) All of these
11.  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + 22 \text{ kcal}$ .  
The activation energy for the forward reaction is 50 kcal. What is the activation energy for the backward reaction?
- a) -72 kcal      b) -28 kcal      c) +28 kcal      d) +72 kcal
12. According to collision theory:
- a) Collisions are sufficiently violent  
b) All collision are responsible for reaction  
c) All collisions are effective  
d) Only highly energetic molecules have enough energy to react
13. The rate constant of a first order reaction whose half-life is 480 s is
- a)  $1.44 s^{-1}$       b)  $1.44 \times 10^{-3} s^{-1}$       c)  $2.88 \times 10^{-3} s^{-1}$       d)  $0.72 \times 10^{-3} s^{-1}$

14.  $2A \rightarrow B + C$ ; It would be a zero order reaction when:
- The rate of reaction is proportional to square of conc. of A
  - The rate of reaction remains same at any conc. of A
  - The rate remains unchanged at any conc. of B and C
  - The rate of reaction doubles if conc. of B is increased to double

15. For a reaction  $A + 2B \rightarrow C$ , rate is given by

$$r = k[A][B]^2$$

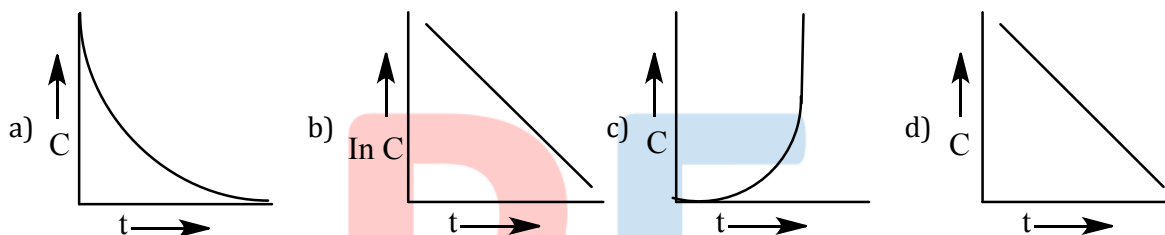
The order of reaction is:

- 3
- 6
- 5
- 7

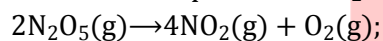
16. Rate constant for a reaction is  $\lambda$ . Average life is represent by

- $\frac{1}{\lambda}$
- $\frac{1n^2}{\lambda}$
- $\frac{\lambda}{\sqrt{2}}$
- $\frac{0.693}{\lambda}$

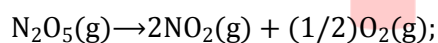
17. The plot between concentration versus time for a zero order reaction is represented by



18. For the decomposition of  $N_2O_5(g)$ , it is given that:



Activation energy  $E_a$



Activation energy  $E'_a$

then;

- $E_a = E'_a$
- $E_a > E'_a$
- $E_a < E'_a$
- $E_a = 2E'_a$

19. During the kinetic study of the reaction  $2A + B \rightarrow C + D$  following results were obtained.

Run	[A] in M	[B] in M	Initial rate of formation of D in $Ms^{-1}$
I	0.1	0.1	$6.0 \times 10^{-3}$
II	0.3	0.2	$7.2 \times 10^{-2}$
III	0.3	0.4	$2.88 \times 10^{-1}$
IV	0.4	0.1	$2.40 \times 10^{-2}$

On the basis of above data which one is correct:

- $r = k[A]^2[B]$
- $r = k[A][B]$
- $r = k[A^2][B]^2$
- $r = k[A][B]^2$

20. If the reaction rate at a given temperature becomes slower then
- a) The free energy of activation is higher
  - b) The free energy of activation is lower
  - c) The entropy changes
  - d) The initial concentration of the reactants remains constant

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