



## DPP -3 [ Complex Reactions]

### Chapter: Chemical Kinetics

*“One question. Full focus. No distraction. Repeat till victory.No need to do big things... Just do one small step perfectly.”*

## TYPE-1 : Complex Reactions – Mechanism & Rate Determining Step

1. For an elementary process  $2X + Y \rightarrow Z + W$ , the molecularity is –

- (1) 2                      (2) 1  
(3) 3                      (4) Unpredictable

2. The rate law for the single step reaction  $2A + B \rightarrow 2C$ , is given by

- (1) Rate =  $K[A][B]$                       (2) Rate =  $K[A]^2[B]$   
(3) Rate =  $K[2A][B]$                       (4) Rate =  $K[A]^4[B]^2$

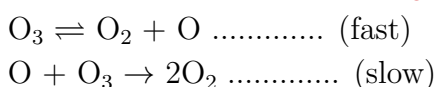
3. Following mechanism has been proposed for a reaction  $2A + B \rightarrow D + E$



The rate law expression for the reaction is –

- (1)  $r = K[A]^2[B]$                       (2)  $r = K[A][B]$   
(3)  $r = K[A]^2$                       (4)  $r = K[A][C]$

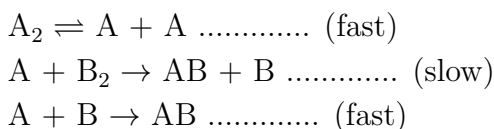
4. The chemical reaction  $2O_3 \rightarrow 3O_2$  proceeds as follows



The rate law expression should be –

- (1)  $r = K[O_3]^2$                       (2)  $r = K[O_3]^2[O_2]^{-1}$   
(3)  $r = K[O_3][O_2]$                       (4) Unpredictable

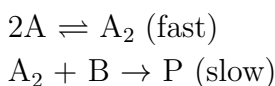
5. The hypothetical reaction  $A_2 + B_2 \rightarrow 2AB$  follows the mechanism as given below –



The order of the over all reaction is –

- (1) 2                      (2) 1  
(3)  $1\frac{1}{2}$                       (4) Zero

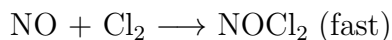
6. The reaction  $2A + B \rightarrow P$ , follows the mechanism



The order of the reaction is :-

- (1) 1.5                      (2) 3  
(3) 1                      (4) 2

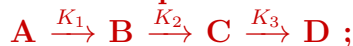
7. For the reaction  $2\text{NO} + \text{Cl}_2 \rightarrow 2\text{NOCl}$  the following mechanism has been proposed



$\text{NOCl}_2 + \text{NO} \rightarrow 2\text{NOCl}$  (slow) the rate law for the reaction is :-

- (1) Rate =  $K[\text{NO}]^2[\text{Cl}_2]$                       (2) Rate =  $K[\text{NO}][\text{Cl}_2]^2$   
(3) Rate =  $K[\text{NOCl}_2]$                               (4) Rate =  $K[\text{NOCl}]^2$

8. In the sequence of reaction



$K_3 > K_2 > K_1$ , then the rate determining step of the reaction is :-

- (1)  $\text{A} \rightarrow \text{B}$                                       (2)  $\text{C} \rightarrow \text{D}$   
(3)  $\text{B} \rightarrow \text{C}$                                       (4)  $\text{A} \rightarrow \text{D}$

9. The reaction mechanism for the reaction  $\text{P} \rightarrow \text{R}$  is as follows :-



the rate law for the main reaction ( $\text{P} \rightarrow \text{R}$ ) is [where  $K_1$  is an equilibrium constant]

- (1)  $k_1[\text{P}][\text{Q}]$                                       (2)  $k_1k_2[\text{P}]$   
(3)  $k_1k_2[\text{P}]^2$                                       (4)  $k_1k_2[\text{a}]$

10. The reaction of ozone with oxygen atoms in the presence of chlorine atoms can occur by a two step process show below:



The closest rate constant for the overall reaction  $\text{O}_3(\text{g}) + \text{O}\cdot(\text{g}) \rightarrow 2\text{O}_2(\text{g})$  is:

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- (1)  $1.4 \times 10^{20} \text{ L mol}^{-1} \text{ s}^{-1}$                       (2)  $5.2 \times 10^9 \text{ L mol}^{-1} \text{ s}^{-1}$   
(3)  $3.1 \times 10^{10} \text{ L mol}^{-1} \text{ s}^{-1}$                       (4)  $2.6 \times 10^{10} \text{ L mol}^{-1} \text{ s}^{-1}$