
12TH – JEE/NEET

TOPIC :- Chemical Kinetics (DPP)

DPP-01: Rate of reaction

1. xA + yB → zC. If $= -\frac{d[A]}{dt} = -\frac{d[B]}{dt} 1.5 = \frac{d[C]}{dt}$ then x,y and z can be :

(1) 1,1,1 (2) 3,2,3 (3) 3,3,2 (4) 2,2,3

2. The rate of a reaction is expressed in different ways as follows ;

+ 1/2(d[C]/dt) = – 1/3 (d[D]/dt) = + 1/4 (d[A]/dt) = – (d[B]/dt) The reaction can be :

(1) $4A + B \longrightarrow 2C + 3D$ (2) $B + 3D \longrightarrow 4A + 2C$

(3) $4A + 2B \longrightarrow 2C + 3D$ (4) $B + (1/2)D \longrightarrow 4A + 3C$

3. Consider the chemical reaction :

$N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$

The rate of this reaction can be expressed ;in terms of time and of concentration of $N_2(g)$, $H_2(g)$ or $NH_3(g)$. Identify the correct relationship amongest the rate expressions.

(1) Rate $= -\frac{d[N_2]}{dt} = \frac{1}{3}\frac{d[H_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$ (2) Rate $= -\frac{d[N_2]}{dt} = -\frac{3d[H_2]}{dt} = \frac{2d[NH_3]}{dt}$

(3) Rate $= -\frac{d[N_2]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt} = \frac{d[NH_3]}{dt}$ (4) Rate $= -\frac{d[N_2]}{dt} = \frac{d[H_2]}{dt} = \frac{d[NH_3]}{dt}$

4. In a reaction $N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$ the rate of appearance of NH_3 is 2.5×10^{-4} mol L^{-1} sec^{-1}. The rate of reaction & rate of disappearance of H_2 will be (in mol L^{-1} sec^{-1})

(1) 3.75×10^{-4} , 1.25×10^{-4} (2) 1.25×10^{-4}, 2.5×10^{-4}

(3) 1.25×10^{-4}, 3.75×10^{-4} (4) 5.0×10^{-4}, 3.75×10^{-4}

5. $3A \rightarrow 2B$, rate of reaction $\frac{+d[B]}{dt}$ is equal to :

(1) $-\frac{3}{2}\frac{d[A]}{dt}$ (2) $-\frac{2}{3}\frac{d[A]}{dt}$ (3) $-\frac{1}{3}\frac{d[A]}{dt}$ (4) $+2\frac{d[A]}{dt}$

6. In the reaction; $A + 2B \longrightarrow 3C + D$, which of the following expression does not describe changes in the concentration of various species as a function of time :

(1) {d [C] / dt} = – {3d [A] / dt} (2) {3d [D] / dt} = {d [C] / dt}

(3) {3d [B] / dt} = – {2d [C] / dt} (4) {2d [B] / dt} = – {d [A] / dt}

7. In the following reaction : $xA \longrightarrow yB$

$$\log\left[-\frac{d[A]}{dt}\right] = \log\left[\frac{d[B]}{dt}\right] + \log 2$$

where –ve sign indicates rate of disappearance of the reactant. Thus, x : y is :

(1) 1 : 2 (2) 2 : 1 (3) 3 : 1 (4) 3 : 10

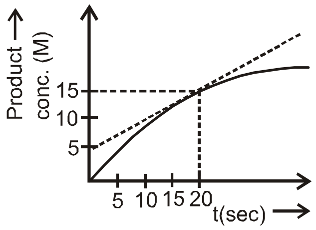
8. Which of the following statements is correct?

(1) The rate of a reaction decreases or remain constant with passage of time as the concentration of reactants dereases.
(2) The rate of a reaction is same at any time during the reaction.
(3) The rate of a reaction is independent of temperature change.
(4) The rate of a reaction decreases with increase in concentration of reactant(s).

9. Which of the following expressions is correct for the rate of reaction given below ?

$5Br^-(aq) + BrO_3^- (aq) + 6H^+ (aq) \longrightarrow 3Br_2(aq) + 3H_2O(l)$

(1) $\frac{\Delta[Br^-]}{\Delta t} = 5 \frac{\Delta[H^+]}{\Delta t}$
(2) $\frac{\Delta[Br^-]}{\Delta t} = \frac{6}{5}\frac{\Delta[H^+]}{\Delta t}$
(3) $\frac{\Delta[Br^-]}{\Delta t} = \frac{5}{6}\frac{\Delta[H^+]}{\Delta t}$
(4) $\frac{\Delta[Br^-]}{\Delta t} = 6 \frac{\Delta[H^+]}{\Delta t}$

10. 

Rate of formation of product at t = 20 seconds is

(1) 0.5 MS^{-1} (2) 1 M S^{-1} (3) 1.5 M S^{-1} (4) $2MS^{-1}$

11. Rate of formation of SO_3 in the following reaction $2SO_2 + O_2 \rightarrow 2SO_3$ is 100 g min^{-1}. Hence rate of disappearance of O_2 is :

(1) 50 g min^{-1} (2) 40 g min^{-1} (3) 200 g min^{-1} (4) 20 g min^{-1}

12. If rate constant is numerically the same for the three reactions of first, second and third order respectively. Assume all the reactions of the kind A → products. Which of the following is correct :

(1) if [A] = 1 then $r_1 = r_2 = r_3$
(2) if [A] < 1 then $r_1 > r_2 > r_3$
(3) if [A] > 1 then $r_3 > r_2 > r_1$
(4) All

DPP-02 : Rate law

1. $aA + bB \longrightarrow$ Product, $dx/dt = k [A]^a [B]^b$. If conc of A is doubled, rate is four times. If conc. of B is made four times, rate is doubled. What is relation between rate of disappearance of A and that of B ?

(1) {– d [A] / dt} = {– d [B] / dtK
(2) – {d [A] / dt} = – 4 {d [B] / dt}
(3) – 4 {d [A] / dt) = {– d [B]/ dt}
(4) None of these

2. For a reaction pA + qB → products, the rate law expression is $r = k[A]^1 [B]^m$, then :

(1) (p+1) < (1+ m)
(2) (p + q) > (1 + m)
(3) (p + q) may or may not be equal to (1+ m)
(4) (p + q) = (1 + m)

3. For the reaction $H_2 + Br_2 \rightarrow 2\ HBr$ overall order is found to be 3/2. The rate of reaction can be expressed as:

(1) $[H_2][Br_2]^{1/2}$ (2) $[H_2]^{1/2} [Br_2]$ (3) $[H_2]^{3/2} [Br_2]^0$ (4) All of these

4. The rate of certain hypothetical reaction A + B + C → products is given by $r = \frac{-d[A]}{dt} = K [A]^{1/2}[B]^{1/3}[C]^{1/4}$ The order of the reaction :

(1) 1 (2) $\frac{1}{2}$ (3) 2 (4) $\frac{13}{12}$

5. 2A $\rightarrow$ B + C it would be a zero order reaction when :

(1) The rate of reaction is proportional to square of conc. of A
(2) The rate of reaction remains same at any conc. of A
(3) The rate remains unchanged at any conc. of B and C
(4) The rate of reaction doubles if conc. of B is increased to double

6. The rate equation for the reaction 2A + B $\rightarrow$ C is found to be : rate k[A][B]. The correct statement in relation to this reaction is that the

(1) Rate of formation of C is twice the rate of disappearance of A.
(2) Half life is a constant
(3) Unit of k must be s^{-1}
(4) Value of k is independent of the initial concentration of A and B

7. For the reaction, $2NO(g) + 2H_2(g) \longrightarrow N_2(g) + 2H_2O(g)$ the rate expression can be written in the following ways:

$\{dt\,[N_2] / dt\} = k_1\,[NO][H_2]$; $\{d[H_2O] / dt) = k[NO][H_2]$; $\{-\,d[NO] / dt\} = k'_1\,[NO]\,[H_2]$; $\{-d[H_2] / dt\} = k''_1\,[NO][H_2]$

The relationship between k, k_1 , k'_1 and k''_1. is :

(1) $k = k_1 = k'_1 = k''_1$ (2) $k = 2k_1 = k'_1 = k''_1$ (3) $k = 2k'_1 = k_1 = k''_1$ (4) $k = k_1 = k'_1 = 2\,k''_1$

8. If a reaction gets completed in finite time then its order can be :

(1) 3 (2) 2 (3) 1 (4) Zero

9. For the reaction A + B $\rightarrow$ Products, it is found that the order of A is 2 and of B is 3 in the rate expression. When concentration of both is doubled the rate will increase by a factor of :

(1) 10 (2) 6 (3) 32 (4) 16

10. For a reaction A + B $\rightarrow$ products, the rate of the reaction was doubled when the concentration of. A was doubled, the rate was again doubled when the conc. of A & B were doubled the order of the reaction with respect to A & B are :

(1) 1,1 (2) 2,0 (3) 1,0 (4) 0,1

DPP-03 : The integrated rate laws

1. The rate constant of reaction 2 A + B $\longrightarrow$ C is 2.57 × 10^{-5} lt mole^{-1} sec^{-1} after 10 sec. 2.65 × 10^{-5} lt. mole^{-1} sec^{-1} after 20 sec. and 2.55 × 10^{-5} lt. mole^{-1} sec^{-1} after 30 sec. The order of the reaction is:

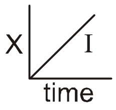
(1) 0 (2) 1 (3) 2 (4) 3

2. For a first order reaction, the plot of 't' against log C gives a straight line with slope equal to :

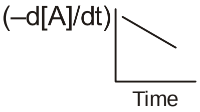
(1) (k / 2.303) (2) (– k / 2.303) (3) (ln k / 2.303) (4) – k.

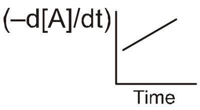
3. In a first order reaction the amount of reactant decayed in three half lives (let a be is initial amount) would be:

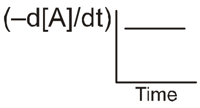
(1) 7a / 8 (2) a / 8 (3) a / 6 (4) 5a / 6

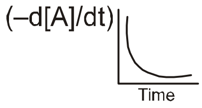
4. Graph between concentration of the product and time of the reaction A $\rightarrow$ B is of the type 

Hence graph between – d[A]/dt and time will be of the type :

(1) 

(2) 

(3) 

(4) 

5. The reaction N_2O_5 (in CCl_4) $\rightarrow$ $2NO_2 + 1/2O_2(g)$ is first order in N_2O_5 with rate constant 6.2×10^{-4} S^{-1}. What is the value of rate of reaction when $[N_2O_5] = 1.25$ mole L^{-1}

(1) 7.75×10^{-4} mol L^{-1} S^{-1}
(2) 6.35×10^{-3} mol L^{-1} S^{-1}
(3) 5.15×10^{-5} mol L^{-1} S^{-1}
(4) $3,85 \times 10^{-4}$ mol L^{-1} S^{-1}

6. K for a zero order reaction is 2×10^{-2} mol L^{-1} sec^{-1} . If the concentration of the reactant after 25 sec is 0.5 M, the initial concentration must have been.

(1) 0.5 M
(2) 1.25 M
(3) 12.5 M
(4) 1.0 M

7. Plot of log(a–x) vs time t is straight line. This indicates that the reaction is of

(1) Second order
(2) First order
(3) Zero order
(4) Third order

8. In a certain reaction, 10% of the reactant decomposes in one hour, 20 % in two hours, 30% in three hours and so on the dimensions of the rate constant is :

(1) $hour^{-1}$
(2) mole $litre^{-1}$ sec^{-1}
(3) litre $mole^{-1}$ sec^{-1}
(4) mole sec^{-1}

9. If a first order reaction is completed to the extent of 75% and 50% in time intervals, t_1 and t_2, what is the ratio, $t_1 : t_2$?

(1) ln 2
(2) $\frac{\ln(3/4)}{\ln 2}$
(3) 2
(4) 1/2

10. The rate constant for a reaction is $\frac{\ln 2}{10}$ min^{-1}. What will be the order of reaction and time taken to change concentration from 1 M to 0.25 M.

(1) one, 10 min
(2) zero, 10 min
(3) one, 20 min
(4) two, 20 min

11. In the case of zero order reaction, the ratio of time required for 75% completion to 50% completion is :

(1) ln 2
(2) 2
(3) 1.5
(4) None

12. For the irreversible process, A + B $\longrightarrow$ products, the rate is first–order w.r.t. A and second–order w.r.t. B. If 1.0 mol each of A and B introduced into a 1.0 L vessel, and the initial rate was 1.0×10^{-2} mol L^{-1} s^{-1} , rate when half reactants have been turned into products is :

(1) 1.25×10^{-3} mol L^{-1} s^{-1}
(2) 1.0×10^{-2} mol L^{-1} s^{-1}
(3) 2.50×10^{-3} mol L^{-1} s^{-1}
(4) 2.0×10^{-2} mol L^{-1} s^{-1}

13. The rate constant of the reaction $A \rightarrow 2B$ is 1.0×10^{-3} mol lit^{-1} min^{-1}, if the initial concentration of A is 1.0 mole lit^{-1} what would be the concentration of B after 100 minutes.

(1) 0.1 mol lit^{-1}
(2) 0.2 mol lit^{-1}
(3) 0.9 mol lit^{-1}
(4) 1.8 mol lit^{-1}

14. Two substances A ($t_{1/2}$ = 5 min) and B ($t_{1/2}$ = 15 min) are taken in such a way that initially [A] = 4[B]. The time after which both the concentration will be equal is : (Assume that reaction is first order)

(1) 5 min
(2) 15 min
(3) 20 min
(4) concentration can never be equal

15. In a first order reaction the reacting substance has half-life period of ten minutes. What fraction of the substance will be left after an hour the reaction has occurred ? :

(1) 1/6 of initial concentration
(2) 1/64 of initial concentration
(3) 1/12 of initial concentration
(4) 1/32 of initial concentration

16. A reaction, which is second order, has a rate constant of 0.002 L mol^{-1} s^{-1}. If the initial conc. of the reactant is 0.2 M. how long will it take for the concentration to become 0.0400 M ?

(1) 1000 sec
(2) 400 sec
(3) 200 sec
(4) 10, 000 sec

17. Which is not true for a second order reaction ?

(1) It can have rate constant 1×10^{-2} L mol^{-1} s^{-1}

(2) Its half-life is inversely proportional to its initial concentration

(3) Time to complete 75% reaction is twice of half-life

(4) $T_{50} = \dfrac{1}{K \times \text{Initial conc.}}$

DPP-04: Methods to determine the rate law

1. The data for the reaction $A + B \rightarrow C$ is

Exp.	$[A]_0$	$[B]_0$	initial rate
1	0.012	0.035	0.10
2	0.024	0.035	0.80
3	0.012	0.070	0.10
4	0.024	0.070	0.80

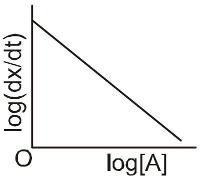
(1) $r = k[B]^3$ (2) $r = k[A]^3$ (3) $r = k[A][B]^4$ (4) $r = k[A]^2[B]^2$.

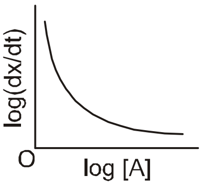
2. $A + B \longrightarrow$ Product, $\dfrac{dx}{dt} = k[A]^a[B]^b$

If $\left(\dfrac{dx}{dt}\right) = k$, then order is :

(1) 4 (2) 2 (3) 1 (4) 0

3. $A \rightarrow$ Product and $\left(\dfrac{dx}{dt}\right) = k[A]^2$. If $\log\left(\dfrac{dx}{dt}\right)$ is plotted against log [A],then graph is of the type :

(1)


(2)


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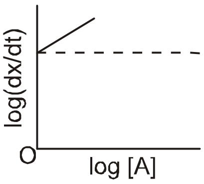

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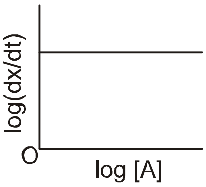


4. For the reaction $A \longrightarrow$ Products, $-\dfrac{d[A]}{dt} = k$ and at different time interval, [A] values are :

Time	0	5 min	10 min	15 min
[A]	20 mol	18 mol	16 mol	14 mol

At 20 minute, rate will be :

(1) 12 mol /min (2) 10 mol/min (3) 8 mol/min (4) 0.4 mol/min

5. The rate law for a reaction $A + B \rightarrow$ product is rate $= K[A]^1[B]^2$. Then which one of the following statement is false :

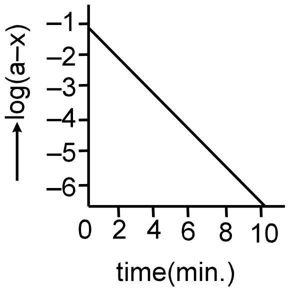
(1) If [B] is held constant while [A] is doubled, the reaction will proceed twice as fast

(2) If [A] is held constant while [B] is reduced to one quater, the rate will be halved

(3) If [A] and [B] are both doubled, the reaction will proceed 8 times as fast

(4) This is a third order reaction

6. The conversion of vinyl allyl ether to pent-4-enol follows a certain kinetics. The following plot is obtained for such a reaction. The order for the reaction is



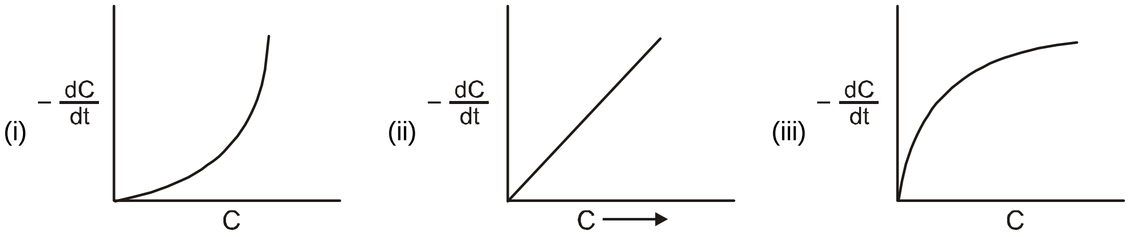
(1) zero (2) –1 (3) 1 (4) 2

7. The reaction A(s) → 2 B(g) + C(g) is first order. The pressure after 20 min. and after very long time are 150 mm Hg and 225 mm Hg. The value of rate constant and pressure after 40 min. are :

(1) 0.05 In 1.5 min^{-1}, 200 mm (2) 0.5 ln 2 min^{-1} ,300 mm

(3) 0.05 In 3 min^{-1}, 300 mm (4) 0.05 In 3 min^{-1}, 200 mm

8. In three different reactions, involving a single reactant in each case, a plot of rate of the reaction on the y–axis, versus concentration of the reactant on the x–axis, yields three different curves shown below.



What are the possible orders of the reactions (i), (ii), (iii).

(1) 1, 2, 3 (2) 2, 1, 1/2 (3) 0, 1, 2 (4) 0, 1, 1/2

DPP-05 : Methods to monitor the progress of the reaction

1. Consider the reaction $2A(g) \longrightarrow 3B(g) + C(g)$. Starting with pure A initially, the total pressure doubled in 3 hrs. The order of the reaction might possibly be

(1) zero (2) first

(3) second (4) unpredictable from this data

2. At 373 K, a gaseous reaction A → 2B + C is found to be of first order. Starting with pure A, the total pressure at the end of 10 min. was 176 mm and after a long time when A was completely dissociated, it was 270 mm. The pressure of A at the end of 10 minutes was :

(1) 94 mm (2) 47 mm (3) 43 mm (4) 90 mm

3. Let there be as first-order reaction of the type, $A \longrightarrow B + C$. Let us assume that only A is geseous. We are required to calculate the value of rate constant based on the following data.

Time	0	T	∞
Partial pressure of A	P_0	P_t	–

Calculate the expression of rate constant.

(1) $k = \frac{1}{t} \ln\left(\frac{P_0}{P_t}\right)$ (2) $k = \frac{1}{t} \ln\left(\frac{P_t}{P_0}\right)$ (3) $k = \frac{1}{t} \ln\left(\frac{2P_0}{P_t}\right)$ (4) $k = \frac{1}{t} \ln\left(\frac{P_t}{2P_0}\right)$

4. The decompostion NH_3 gas on a heated tungsten surface gave the following results :

Initial pressure (mm)	65	105	y	185
Half-life (sec)	290	x	670	820

Calculate approximately the values of x

(1) x = 410 sec (2) x = 467 sec (3) x = 490 sec (4) x = 430 sec

5. In the reaction NH_4NO_2 (aq.) → N_2 (g) + 2 H_2O (*l*) the volume of N_2 after 20 min and after a long time is 40 ml and 70 ml respectively. The value of rate constant is :

(1) (1/20) In (7/4) min^{-1}
(2) (2.303 /1200) log (7/3) sec^{-1}
(3) (1/20) log (7/3) min^{-1}
(4) (2.303 / 20) log (11/7) min^{-1}

DPP-06 : Effect of Temperature

1. Rate of which reactions increases with temperature :

(1) of any
(2) of exothermic reactions
(3) of endothermic
(4) of none.

2. For a zero order reaction. Which of the following statement is false :

(1) the rate is independent of the temperature of the reaction.
(2) the rate is independent of the concentration of the reactants.
(3) the half life depends as the concentration of the reactants.
(4) the rate constant has the unit mole lt^{-1} sec^{-1}.

3. A large increase in the rate of a reaction for a rise in temperature is due to

(1) increase in the number of collisions
(2) the increase in the number of activated molecules
(3) The shortening of mean free path
(4) the lowering of activation energy

4. The rate constant, the activation energy and the frequency factor of a chemical reaction at 25°C are 3.0×10^{-4} s^{-1}, 104.4 KJ mol^{-1} and 6.0×10^{14} s^{-1} respectively. The value of the rate constant as $T \to \infty$ is :

(1) 2.0×10^{18} s^{-1} (2) 6.0×10^{14} s^{-1} (3) ∞ (4) 3.6×10^{30} s^{-1}

5. According to collision theory of reaction rates –

(1) Every collision between reactant leads to chemical reaction
(2) Rate of reaction is proportional to velocity of molecules
(3) All reactions which occur in gaseous phase are zero order reaction
(4) Rate of reaction is directly proportional to collision frequency.

6. The minimum energy for molecules to enter into chemical reaction is called.

(1) Kinetic energy (2) Potential energy (3) Threshold energy (4) Activation energy

7. The activation energy for the forward reaction $X \to Y$ is 60 KJ mol^{-1} and ΔH is –20 KJ mol^{-1}. The activation energy for the backard reaction $Y \to X$ is :

(1) 80 KJ mol^{-1} (2) 40 KJ mol^{-1} (3) 60 KJ mol^{-1} (4) 20 KJ mol^{-1}

8. For producing the effective collisions, the colloiding molecules must posses :

(1) A certain minimum amount of energy
(2) Energy equal to or greater than threshold energy
(3) Proper orientation
(4) Threshold energy as well as proper orientation of collision.

9. For the first order reaction, $X_{(s)} \longrightarrow X_{(g)}$

the monitoring is done by observing the volume :

time	t	∞
volume	V_t	V_∞

The rate constant is given by :

(1) $\frac{1}{t}\ln\left(\frac{V_\infty}{V_t}\right)$ (2) $\frac{1}{t}\ln\left(\frac{V_\infty}{V_\infty - V_t}\right)$ (3) $\frac{1}{t}\ln\left(\frac{V_\infty + V_t}{V_\infty}\right)$ (4) $\frac{1}{t}\ln\left(\frac{V_\infty + V_t}{V_\infty - V_t}\right)$

10. The first order rate constant k is related to temp. as log k = 15.0 – (10^6 /T) Which of the following pair of value is correct ?

(1) A = 10^{15} and E = 1.9 × 10^4 KJ (2) A = 10^{-15} and E = 40 KJ

(3) A = 10^{15} and E = 40 KJ (4) A = 10^{-15} and E = 1.9 × 10^4 KJ.

11. For a given reaction, energy of activation for forward reaction (E_{af}) is 80kJ.mol^{-1}. $\Delta H = -40$kJ.mol^{-1} for the reaction. A catalyst lowers E_{af} to 20 kJ.mol^{-1}. The ratio of energy of activation for reverse reaction before and after addition of catalyst is :

(1) 1.0 (2) 0.5 (3) 1.2 (4) 2.0

12. The E_a of a reaction in presence of a catalyst is 4.15 kJ mol^{-1} and in absence of a catalyst is 8.3 kJ mol^{-1}. What is slope of the plot of ln k vs $\frac{1}{T}$ in the absence of catalyst

(1) + 1 (2) –1 (3) + 1000 (4) –1000

DPP-07 : Mechanism of reactions

1. For the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ the experiment data suggested that $r = k[H_2][Br_2]^{1/2}$

The molecularity and order of the reaction are respectively :

(1) 2, 3/ 2 (2) 3/2 , 3/2 (3) Not defined, 3/2 (4) 1,1/2

2. The reaction of hydrogen, and iodine monochloride is represented by the equation :

$$H_2(g) + 2ICl(g) \longrightarrow 2HCl(g) + I_2(g)$$

This reaction is first–order in $H_2(g)$ and also first–order in ICl(g). Which of these proposed mechanism can be consistent with the given information about this reaction ?

Mechanism I : $H_2(g) + 2ICl(g) \longrightarrow 2HCl(g) + I_2(g)$

Mechanism II : $H_2(g) + ICl(g) \xrightarrow{\text{Slow}} HCl(g) + HI(g)$

$HI(g) + ICl(g) \xrightarrow{\text{fast}} HCl(g) + I_2(g)$

(1) I only (2) II only (3) both I and II (4) neither I nor II

3. Following mechanism has been proposed for a reaction.

$2A + B \rightarrow D + E$

Step -1 $A + B \rightarrow C + D$ (slow)

Step -2 $A + C \rightarrow E$ (fast)

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. A following mechanism has been proposed for a reaction :

$2A + B \longrightarrow D + E$ K = 2 × 10^{-1} lt^2 mol^{-2} sec^{-1}

$A + B \longrightarrow C + D$ K = 1.5 × 10^{-6} lt/mol sec

$A + C \longrightarrow E$ K = 2 × 10^{-3} lt/mol sec

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]

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

$A_2 \rightleftharpoons A + A$ fast

$A + B_2 \rightarrow AB + B$ slow

$A + B \rightarrow AB$ fast

The order of the overall reaction is :

(1) 2 (2) 1 (3) 1.5 (4) 0

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

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

7. The reaction of NO_2 (g) and O_3 (g) is first-order in NO_2 (g) and O_3 (g)

$$2\,NO_2\,(g) + O_3\,(g) \longrightarrow N_2O_5\,(g) + O_2\,(g)$$

The reaction can take place by mechanism :

I : $NO_2 + O_3 \xrightarrow{\text{slow}} NO_3 + O_2$

$NO_3 + NO_2 \xrightarrow{\text{fast}} N_2O_5$

II : $O_3 \underset{k_b}{\overset{k_a\ \text{fast}}{\rightleftharpoons}} O_2 + [O]$

$NO_2 + O \xrightarrow{\text{slow}} NO_3$

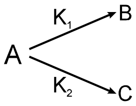
$NO_3 + NO_2 \xrightarrow{\text{fast}} N_2O_5$

Select correct mechanism.

(1) I only (2) II only (3) both I and II (4) None of I and II

DPP-08: Complications in first order reactions

1. The substance undergoes first order decomposition. The decomposition follows two parallel first order reactions as :



$K_1 = 1.26 \times 10^{-4}\ \text{sec}^{-1}$ and $K_2 = 3.8 \times 10^{-5}\ \text{sec}^{-1}$

The percentage distribution of B and C

(1) 80% B and 20% C (2) 76.83% B and 23.17%C

(3) 90% B and 10% C (4) 60% B and 40% C

Answers

EXERCISE - 1

DPP-01

1.	(3)	**2.**	(2)	**3.**	(1)	**4.**	(3)	**5.**	(2)	**6.**	(4)	**7.**	(2)
8.	(1)	**9.**	(3)	**10.**	(1)	**11.**	(4)	**12.**	(4)				

DPP-02

1.	(2)	**2.**	(3)	**3.**	(4)	**4.**	(4)	**5.**	(2)	**6.**	(4)	**7.**	(2)
8.	(4)	**9.**	(3)	**10.**	(3)								

DPP-03

1.	(3)	**2.**	(2)	**3.**	(1)	**4.**	(3)	**5.**	(1)	**6.**	(4)	**7.**	(2)
8.	(2)	**9.**	(3)	**10.**	(3)	**11.**	(3)	**12.**	(1)	**13.**	(2)	**14.**	(2)
15.	(2)	**16.**	(4)	**17.**	(3)								

DPP-04

1.	(2)	**2.**	(4)	**3.**	(3)	**4.**	(4)	**5.**	(2)	**6.**	(3)	**7.**	(4)
8.	(2)												

DPP-05

1.	(1)	**2.**	(2)	**3.**	(1)	**4.**	(2)	**5.**	(2)

DPP-06

1.	(1)	**2.**	(1)	**3.**	(2)	**4.**	(2)	**5.**	(4)	**6.**	(3)	**7.**	(1)
8.	(4)	**9.**	(2)	**10.**	(1)	**11.**	(4)	**12.**	(4)				

DPP-07

1.	(3)	**2.**	(2)	**3.**	(2)	**4.**	(2)	**5.**	(3)	**6.**	(3)	**7.**	(3)

DPP-08

1. (2)