

PYQSide

NEET CHEMICAL KINETICS — PYQS

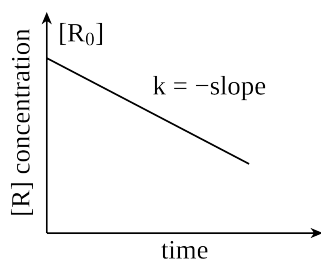
Max. Marks: 300

Questions: 75

Section A (MCQ)

- Q.1** For a certain reaction $R \rightarrow$ Product, the plot of concentration $[R]$ vs time has a negative slope as shown. The order of reaction is :

[NEET (UG) 2026]



- (1) 1 (2) 2.5 (3) 2 (4) 0

Scan or tap for the full solution

- Q.2** Given below is an expression for the rate constant of a first-order reaction occurring at a certain temperature, T (K).

$$\ln k = 14.34 - \frac{1.25 \times 10^4}{T}$$

The energy of activation in kcal mol^{-1} for the reaction is :

(Given : k in s^{-1} , $R = 1.987 \text{ cal mol}^{-1} \text{ K}^{-1}$)

[NEET (UG) 2026]

- (1) 12.42 (2) 18.63 (3) 14.34 (4) 24.84

Scan or tap for the full solution

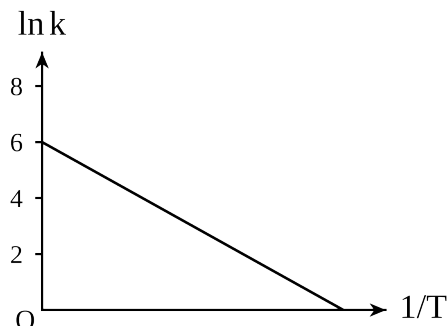
- Q.3** Match List-I with List-II : [NEET (UG) 2026]

List-I (Order of reaction)		List-II (Unit of rate constant)	
A.	Zero order	I.	$\text{mol}^{-1} \text{ L s}^{-1}$
B.	First order	II.	$\text{mol}^{-2} \text{ L}^2 \text{ s}^{-1}$
C.	Second order	III.	s^{-1}
D.	Third order	IV.	$\text{mol L}^{-1} \text{ s}^{-1}$

- (1) A-IV, B-III, C-II, D-I (2) A-IV, B-III, C-I, D-II
(3) A-I, B-II, C-III, D-IV (4) A-IV, B-II, C-I, D-III

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- Q.4** For an elementary chemical reaction, the Arrhenius plot is given below.



If the energy of activation is 6.64 kJ mol^{-1} and $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$, the temperature at which the rate constant becomes $\text{e}^2 \text{ min}^{-1}$, is

[RE-NEET (UG) 2026]

- (1) 250 K (2) 125 K (3) 150 K (4) 200 K

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- Q.5** $2A \xrightarrow{k} B$ is a zero-order reaction, where $k = 1.0 \text{ mol L}^{-1} \text{ min}^{-1}$. If the initial concentration of A is 2 M, then the time taken to complete 75% of the reaction will be [RE-NEET (UG) 2026]

- (1) 2.0 min (2) 1.5 min
(3) 0.75 min (4) 1.0 min

Scan or tap for the full solution

- Q.6** If the rate constant of a reaction is 0.03 s^{-1} , how much time does it take for 7.2 mol L^{-1} concentration of the reactant to get reduced to 0.9 mol L^{-1} ? (Given: $\log 2 = 0.301$)

[NEET (UG) 2025]

- (1) 210 s (2) 21.0 s (3) 69.3 s (4) 23.1 s

Scan or tap for the full solution

- Q.7** If the half-life ($t_{1/2}$) for a first order reaction is 1 minute, then the time required for 99.9% completion of the reaction is closest to :

[NEET (UG) 2025]

- (1) 5 minutes (2) 10 minutes
(3) 2 minutes (4) 4 minutes

Scan or tap for the full solution

- Q.8** Activation energy of any chemical reaction can be calculated if one knows the value of

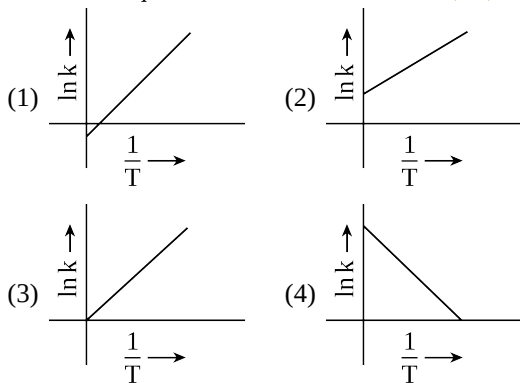
[NEET (UG) 2024]

- (1) rate constant at standard temperature
- (2) probability of collision
- (3) orientation of reactant molecules during collision
- (4) rate constant at two different temperatures

Scan or tap for the full solution



Q.9 Which plot of $\ln k$ vs $\frac{1}{T}$ is consistent with Arrhenius equation? [NEET (UG) 2024]



Scan or tap for the full solution



Q.10 The rate of a reaction quadruples when temperature changes from 27°C to 57°C . Calculate the energy of activation.

Given $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $\log 4 = 0.6021$

[NEET (UG) 2024]

- (1) 38.04 kJ/mol
- (2) 380.4 kJ/mol
- (3) 3.80 kJ/mol
- (4) 3804 kJ/mol

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Q.11 Following data is for a reaction between reactants A and B :

Rate ($\text{mol L}^{-1} \text{s}^{-1}$)	[A]	[B]
2×10^{-3}	0.1 M	0.1 M
4×10^{-3}	0.2 M	0.1 M
1.6×10^{-2}	0.2 M	0.2 M

The order of the reaction with respect to A and B, respectively, are

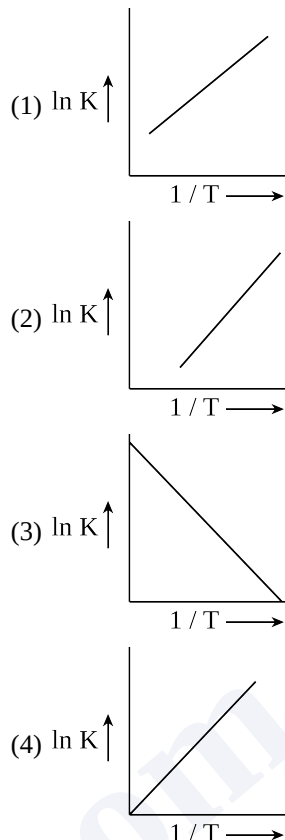
[RE-NEET (UG) 2024]

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

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Q.12 Which of the following plot represents the variation of $\ln k$ versus $\frac{1}{T}$ in accordance with Arrhenius equation? [RE-NEET (UG) 2024]



Scan or tap for the full solution



Q.13 Rate constants of a reaction at 500 K and 700 K are 0.04 s^{-1} and 0.14 s^{-1} , respectively; then, activation energy of the reaction is :

(Given: $\log 3.5 = 0.5441$, $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$)

[RE-NEET (UG) 2024]

- (1) 182310 J
- (2) 18500 J
- (3) 18219 J
- (4) 18030 J

Scan or tap for the full solution



Q.14 For a certain reaction, the rate $= k[A]^2[B]$, when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would

[NEET (UG) 2023]

- (1) increase by a factor of six
- (2) increase by a factor of nine
- (3) increase by a factor of three
- (4) decrease by a factor of nine

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Q.15 Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion (A): A reaction can have zero activation energy.

Reason (R): The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

In the light of the above statements, choose the correct answer from the options given below:

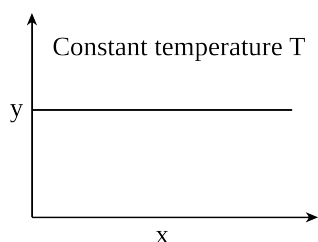
[NEET (UG) 2023]

- (1) Both A and R are true but R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

Scan or tap for the full solution



Q.16 The given graph is a representation of kinetics of a reaction



The y and x axes for zero and first order reactions, respectively are

[NEET (UG) 2022]

- (1) zero order ($y = \text{concentration}$ and $x = \text{time}$), first order ($y = t_{1/2}$ and $x = \text{concentration}$)
- (2) zero order ($y = \text{concentration}$ and $x = \text{time}$), first order ($y = \text{rate constant}$ and $x = \text{concentration}$)
- (3) zero order ($y = \text{rate}$ and $x = \text{concentration}$), first order ($y = t_{1/2}$ and $x = \text{concentration}$)
- (4) zero order ($y = \text{rate}$ and $x = \text{concentration}$), first order ($y = \text{rate}$ and $x = t_{1/2}$)

Scan or tap for the full solution



Q.17 For a first order reaction $A \rightarrow \text{Products}$, initial concentration of A is 0.1 M, which becomes 0.001 M after 5 minutes. Rate constant for the reaction in min^{-1} is

[NEET (UG) 2022]

- (1) 1.3818 (2) 0.9212 (3) 0.4606 (4) 0.2303

Scan or tap for the full solution



Q.18 The half life of a first order reaction is 2000 years. If the concentration after 8000 years is 0.02 M, then the initial concentration was :

[NEET (UG) 2022 (Phase 2)]

- (1) 0.04 M (2) 0.16 M (3) 0.32 M (4) 0.08 M

Scan or tap for the full solution



Q.19 For a chemical reaction
 $4A + 3B \rightarrow 6C + 9D$

Rate of formation of C is $6 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and rate of disappearance of A is $4 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$. The rate of reaction and amount of B consumed in interval of 10 seconds, respectively will be :

[NEET (UG) 2022 (Phase 2)]

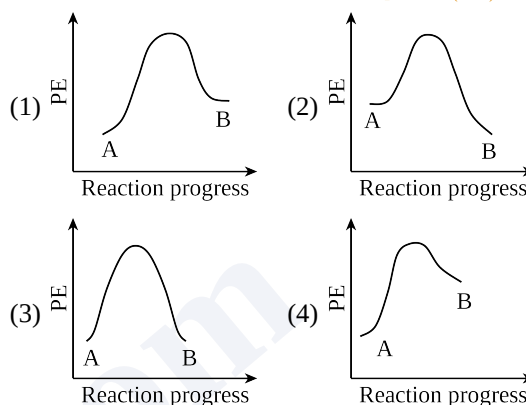
- (1) $10 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $30 \times 10^{-2} \text{ mol L}^{-1}$
- (2) $1 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $30 \times 10^{-2} \text{ mol L}^{-1}$
- (3) $10 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $10 \times 10^{-2} \text{ mol L}^{-1}$
- (4) $1 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $10 \times 10^{-2} \text{ mol L}^{-1}$

Scan or tap for the full solution



Q.20 For a reaction, $A \rightarrow B$, enthalpy of reaction is -4.2 kJ mol^{-1} and enthalpy of activation is 9.6 kJ mol^{-1} . The correct potential energy profile for the reaction is shown in option.

[NEET (UG) 2021]



Scan or tap for the full solution



Q.21 The slope of Arrhenius plot $\left(\ln k \text{ v/s } \frac{1}{T}\right)$ of first order reaction is $-5 \times 10^3 \text{ K}$. The value of E_a of the reaction is. Choose the correct option for your answer.

[Given $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$] [NEET (UG) 2021]

- (1) -83 kJ mol^{-1} (2) 41.5 kJ mol^{-1}
 (3) 83.0 kJ mol^{-1} (4) 166 kJ mol^{-1}

Scan or tap for the full solution



Q.22 An increase in the concentration of the reactants of a reaction leads to change in :

[NEET (UG) 2020]

- (1) heat of reaction (2) threshold energy
 (3) collision frequency (4) activation energy

Scan or tap for the full solution



Q.23 The rate constant for a first order reaction is $4.606 \times 10^{-3} \text{ s}^{-1}$. The time required to reduce 2.0 g of the reactant to 0.2 g is :

[NEET (UG) 2020]

- (1) 200 s (2) 500 s (3) 1000 s (4) 100 s

Scan or tap for the full solution



Q.24 If the rate constant for a first order reaction is k , the time (t) required for the completion of 99 % of the reaction is given by :

[NEET (UG) 2019]

$$(1) t = \frac{4.606}{k}$$

$$(2) t = \frac{2.303}{k}$$

$$(3) t = \frac{0.693}{k}$$

$$(4) t = \frac{6.909}{k}$$

Scan or tap for the full solution



Q.25 For the chemical reaction
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$

the correct option is :

[NEET (UG) 2019]

$$(1) -\frac{d[\text{N}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$$

$$(2) -\frac{d[\text{N}_2]}{dt} = \frac{1}{2} \frac{d[\text{NH}_3]}{dt}$$

$$(3) 3 \frac{d[\text{H}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$$

$$(4) -\frac{1}{3} \frac{d[\text{H}_2]}{dt} = -\frac{1}{2} \frac{d[\text{NH}_3]}{dt}$$

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Q.26 The correct difference between first and second order reactions is that

[NEET 2018]

- (1) the rate of a first-order reaction does not depend on reactant concentrations; the rate of a second-order reaction does depend on reactant concentrations
- (2) the half-life of a first-order reaction does not depend on $[\text{A}]_0$; the half-life of a second order reaction does depend on $[\text{A}]_0$
- (3) a first-order reaction can be catalysed; a second-order reaction cannot be catalysed
- (4) the rate of a first-order reaction does depend on reactant concentrations; the rate of a second-order reaction does not depend on reactant concentrations

Scan or tap for the full solution



Q.27 When initial concentration of the reactant is doubled, the half-life period of a zero order reaction

[NEET 2018]

- (1) is halved
- (2) is doubled
- (3) is tripled
- (4) remains unchanged.

Scan or tap for the full solution



Q.28 Mechanism of a hypothetical reaction
 $\text{X}_2 + \text{Y}_2 \longrightarrow 2\text{XY}$, is given below :

- (i) $\text{X}_2 \rightleftharpoons \text{X} + \text{X}$ (fast)
- (ii) $\text{X} + \text{Y}_2 \longrightarrow \text{XY} + \text{Y}$ (slow)
- (iii) $\text{X} + \text{Y} \longrightarrow \text{XY}$ (fast)

The overall order of the reaction will be

[NEET 2017]

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

Scan or tap for the full solution



Q.29 A first order reaction has a specific reaction rate of 10^{-2} sec^{-1} . How much time will it take for 20 g of the reactant to reduce to 5 g?

[NEET 2017]

- (1) 138.6 sec
- (2) 346.5 sec
- (3) 693.0 sec
- (4) 238.6 sec

Scan or tap for the full solution



Q.30 The rate of first-order reaction is $0.04 \text{ mol L}^{-1} \text{ s}^{-1}$ at 10 seconds and $0.03 \text{ mol L}^{-1} \text{ s}^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is

[NEET 2016 (Phase 1)]

- (1) 44.1 s
- (2) 54.1 s
- (3) 24.1 s
- (4) 34.1 s

Scan or tap for the full solution



Q.31 The addition of a catalyst during a chemical reaction alters which of the following quantities?

[NEET 2016 (Phase 1)]

- (1) Enthalpy
- (2) Activation energy
- (3) Entropy
- (4) Internal energy

Scan or tap for the full solution



Q.32 The decomposition of phosphine (PH_3) on tungsten at low pressure is a first-order reaction. It is because the

[NEET 2016 (Phase 2)]

- (1) rate is proportional to the surface coverage
- (2) rate is inversely proportional to the surface coverage
- (3) rate is independent of the surface coverage
- (4) rate of decomposition is very slow.

Scan or tap for the full solution



Q.33 The rate constant of the reaction $\text{A} \longrightarrow \text{B}$ is $0.6 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$. If the concentration of A is 5 M, then concentration of B after 20 minutes is

[AIPMT 2015]

- (1) 3.60 M
- (2) 0.36 M
- (3) 0.72 M
- (4) 1.08 M

Scan or tap for the full solution



Q.34 The activation energy of a reaction can be determined from the slope of which of the following graphs?

[AIPMT 2015 (Cancelled)]

- (1) $\ln k$ vs. $\frac{1}{T}$
- (2) $\frac{T}{\ln k}$ vs. $\frac{1}{T}$
- (3) $\ln k$ vs. T
- (4) $\frac{\ln k}{T}$ vs. T

Scan or tap for the full solution



Q.35 When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is [AIPMT 2015 (Cancelled)]

- (1) second
(2) more than zero but less than first
(3) zero
(4) first.

Scan or tap for the full solution



Q.36 A reaction having equal energies of activation for forward and reverse reactions has [NEET 2013]

- (1) $\Delta H = 0$ (2) $\Delta H = \Delta G = \Delta S = 0$
(3) $\Delta S = 0$ (4) $\Delta G = 0$

Scan or tap for the full solution



Q.37 What is the activation energy for a reaction if its rate doubles when the temperature is raised from 20°C to 35°C?

- ($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$) [NEET 2013]
(1) 34.7 kJ mol⁻¹ (2) 15.1 kJ mol⁻¹
(3) 342 kJ mol⁻¹ (4) 269 kJ mol⁻¹

Scan or tap for the full solution



Q.38 For a reaction between A and B the order with respect to A is 2 and the order with respect to B is 3. The concentrations of both A and B are doubled, the rate will increase by a factor of

[NEET 2013 (Karnataka)]

- (1) 12 (2) 16 (3) 32 (4) 10

Scan or tap for the full solution



Q.39 A reaction is 50% complete in 2 hours and 75% complete in 4 hours. The order of reaction is

[NEET 2013 (Karnataka)]

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

Scan or tap for the full solution



Q.40 Activation energy (E_a) and rate constants (k_1 and k_2) of a chemical reaction at two different temperatures (T_1 and T_2) are related by

[AIPMT 2012 (Mains)]

- (1) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$
(2) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$
(3) $\ln \frac{k_2}{k_1} = -\frac{E_a}{R} \left(\frac{1}{T_2} + \frac{1}{T_1} \right)$
(4) $\ln \frac{k_2}{k_1} = \frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$

Scan or tap for the full solution



Q.41 In a reaction, $A + B \longrightarrow \text{product}$, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentrations of both the reactants (A and B) are doubled, rate law for the reaction can be written as

[AIPMT 2012 (Prelims)]

- (1) rate = $k[A][B]^2$ (2) rate = $k[A]^2[B]^2$
(3) rate = $k[A][B]$ (4) rate = $k[A]^2[B]$

Scan or tap for the full solution



Q.42 In a zero-order reaction, for every 10°C rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become [AIPMT 2012 (Prelims)]

- (1) 256 times (2) 512 times
(3) 64 times (4) 128 times

Scan or tap for the full solution



Q.43 The rate of the reaction: $2\text{N}_2\text{O}_5 \longrightarrow 4\text{NO}_2 + \text{O}_2$ can be written in three ways.

$$\frac{-d[\text{N}_2\text{O}_5]}{dt} = k[\text{N}_2\text{O}_5]$$

$$\frac{d[\text{NO}_2]}{dt} = k'[\text{N}_2\text{O}_5]; \quad \frac{d[\text{O}_2]}{dt} = k''[\text{N}_2\text{O}_5]$$

The relationship between k and k' and between k and k'' are

[AIPMT 2011 (Mains)]

- (1) $k' = 2k$; $k'' = k$ (2) $k' = 2k$; $k'' = k/2$
(3) $k' = 2k$; $k'' = 2k$ (4) $k' = k$; $k'' = k$

Scan or tap for the full solution



Q.44 The unit of rate constant for a zero order reaction is

[AIPMT 2011 (Mains)]

- (1) mol L⁻¹ s⁻¹ (2) L mol⁻¹ s⁻¹
(3) L² mol⁻² s⁻¹ (4) s⁻¹

Scan or tap for the full solution



Q.45 The half-life of a substance in a certain enzyme-catalysed reaction is 138 s. The time required for the concentration of the substance to fall from 1.28 mg L⁻¹ to 0.04 mg L⁻¹ is

[AIPMT 2011 (Mains)]

- (1) 414 s (2) 552 s (3) 690 s (4) 276 s

Scan or tap for the full solution



Q.46 Which one of the following statements for the order of a reaction is incorrect? [AIPMT 2011 (Prelims)]

- (1) Order can be determined only experimentally.
- (2) Order is not influenced by stoichiometric coefficient of the reactants.
- (3) Order of a reaction is sum of power to the concentration terms of reactants to express the rate of reaction.
- (4) Order of reaction is always whole number.

Scan or tap for the full solution



Q.47 The rate of the reaction, $2\text{NO} + \text{Cl}_2 \longrightarrow 2\text{NOCl}$ is given by the rate equation $\text{rate} = k[\text{NO}]^2[\text{Cl}_2]$. The value of the rate constant can be increased by

[AIPMT 2010 (Mains)]

- (1) increasing the temperature
- (2) increasing the concentration of NO
- (3) increasing the concentration of the Cl_2
- (4) doing all of these.

Scan or tap for the full solution



Q.48 For an endothermic reaction, energy of activation is E_a and enthalpy of reaction is ΔH (both of these in kJ/mol). Minimum value of E_a will be

[AIPMT 2010 (Prelims)]

- (1) less than ΔH
- (2) equal to ΔH
- (3) more than ΔH
- (4) equal to zero

Scan or tap for the full solution



Q.49 For the reaction $\text{N}_2\text{O}_5(\text{g}) \longrightarrow 2\text{NO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g})$ the value of rate of disappearance of N_2O_5 is given as $6.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as

[AIPMT 2010 (Prelims)]

- (1) $6.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$ and $6.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$
- (2) $1.25 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $3.125 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$
- (3) $6.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$ and $3.125 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$
- (4) $1.25 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ and $6.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$

Scan or tap for the full solution



Q.50 For the reaction, $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$, if

$$\frac{d[\text{NH}_3]}{dt} = 2 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1},$$

the value of $\frac{-d[\text{H}_2]}{dt}$ would be

[AIPMT 2009]

- (1) $4 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$
- (2) $6 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$
- (3) $1 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$
- (4) $3 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$

Scan or tap for the full solution



Q.51 During the kinetic study of the reaction, $2\text{A} + \text{B} \longrightarrow \text{C} + \text{D}$, following results were obtained

Run	[A]/mol L ⁻¹	[B]/mol L ⁻¹	Initial rate of formation of D/mol L ⁻¹ min ⁻¹
I.	0.1	0.1	6.0×10^{-3}
II.	0.3	0.2	7.2×10^{-2}
III.	0.3	0.4	2.88×10^{-1}
IV.	0.4	0.1	2.40×10^{-2}

Based on the above data which one of the following is correct?

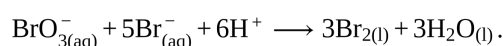
[AIPMT 2010 (Prelims)]

- (1) $\text{Rate} = k[\text{A}]^2[\text{B}]$
- (2) $\text{Rate} = k[\text{A}][\text{B}]$
- (3) $\text{Rate} = k[\text{A}]^2[\text{B}]^2$
- (4) $\text{Rate} = k[\text{A}][\text{B}]^2$

Scan or tap for the full solution



Q.52 In the reaction,



The rate of appearance of bromine (Br_2) is related to rate of disappearance of bromide ions as

[AIPMT 2009]

- (1) $\frac{d[\text{Br}_2]}{dt} = -\frac{5}{3} \frac{d[\text{Br}^-]}{dt}$
- (2) $\frac{d[\text{Br}_2]}{dt} = \frac{5}{3} \frac{d[\text{Br}^-]}{dt}$
- (3) $\frac{d[\text{Br}_2]}{dt} = \frac{3}{5} \frac{d[\text{Br}^-]}{dt}$
- (4) $\frac{d[\text{Br}_2]}{dt} = -\frac{3}{5} \frac{d[\text{Br}^-]}{dt}$

Scan or tap for the full solution



Q.53 Half-life period of a first order reaction is 1386 s. The specific rate constant of the reaction is

[AIPMT 2009]

- (1) $0.5 \times 10^{-2} \text{ s}^{-1}$
- (2) $0.5 \times 10^{-3} \text{ s}^{-1}$
- (3) $5.0 \times 10^{-2} \text{ s}^{-1}$
- (4) $5.0 \times 10^{-3} \text{ s}^{-1}$

Scan or tap for the full solution



Q.54 For the reaction $\text{A} + \text{B} \longrightarrow \text{products}$, it is observed that

- (i) on doubling the initial concentration of A only, the rate of reaction is also doubled and
- (ii) on doubling the initial concentration of both A and B, there is a change by a factor of 8 in the rate of the reaction.

The rate of this reaction is given by

[AIPMT 2009]

- (1) $\text{rate} = k[\text{A}]^2[\text{B}]^2$
- (2) $\text{rate} = k[\text{A}][\text{B}]^2$
- (3) $\text{rate} = k[\text{A}][\text{B}]$
- (4) $\text{rate} = k[\text{A}]^2[\text{B}]$

Scan or tap for the full solution



Q.55 The rate constants k_1 and k_2 for two different reactions are $10^{16} \cdot e^{-2000/T}$ and $10^{15} \cdot e^{-1000/T}$, respectively.

The temperature at which $k_1 = k_2$ is

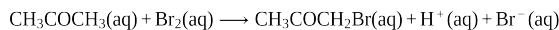
[AIPMT 2008]

- (1) 2000 K (2) $\frac{1000}{2.303}$ K
 (3) 1000 K (4) $\frac{2000}{2.303}$ K

Scan or tap for the full solution



Q.56 The bromination of acetone that occurs in acid solution is represented by this equation.



These kinetic data were obtained for given reaction concentrations.

$[\text{CH}_3\text{COCH}_3]$, M	$[\text{Br}_2]$, M	$[\text{H}^+]$, M	Initial rate, disappearance of Br_2 , M s^{-1}
0.30	0.05	0.05	5.7×10^{-5}
0.30	0.10	0.05	5.7×10^{-5}
0.30	0.10	0.10	1.2×10^{-4}
0.40	0.05	0.20	3.1×10^{-4}

Based on these data, the rate equation is

[AIPMT 2008]

- (1) $\text{Rate} = k[\text{CH}_3\text{COCH}_3][\text{Br}_2][\text{H}^+]^2$
 (2) $\text{Rate} = k[\text{CH}_3\text{COCH}_3][\text{Br}_2][\text{H}^+]$
 (3) $\text{Rate} = k[\text{CH}_3\text{COCH}_3][\text{H}^+]$
 (4) $\text{Rate} = k[\text{CH}_3\text{COCH}_3][\text{Br}_2]$

Scan or tap for the full solution



Q.57 If 60% of a first order reaction was completed in 60 minutes, 50% of the same reaction would be completed in approximately

($\log 4 = 0.60$, $\log 5 = 0.70$)

[AIPMT 2007]

- (1) 45 minutes (2) 60 minutes
 (3) 40 minutes (4) 50 minutes

Scan or tap for the full solution



Q.58 In a first-order reaction $\text{A} \longrightarrow \text{B}$, if k is rate constant and initial concentration of the reactant A is 0.5 M, then the half-life is

[AIPMT 2007]

- (1) $\frac{\log 2}{k}$ (2) $\frac{\log 2}{k\sqrt{0.5}}$
 (3) $\frac{\ln 2}{k}$ (4) $\frac{0.693}{0.5k}$

Scan or tap for the full solution



Q.59 For the reaction, $2\text{A} + \text{B} \longrightarrow 3\text{C} + \text{D}$, which of the following does not express the reaction rate?

[AIPMT 2006]

- (1) $-\frac{d[\text{A}]}{2dt}$ (2) $-\frac{d[\text{C}]}{3dt}$ (3) $-\frac{d[\text{B}]}{dt}$ (4) $\frac{d[\text{D}]}{dt}$

Scan or tap for the full solution



Q.60 If the rate of the reaction is equal to the rate constant, the order of the reaction is

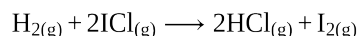
[AIPMT 2003]

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

Scan or tap for the full solution

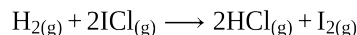


Q.61 The reaction of hydrogen and iodine monochloride is given as:

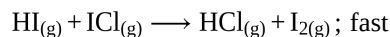
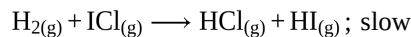


This reaction is of first order with respect to $\text{H}_2(\text{g})$ and $\text{ICl}(\text{g})$. The following mechanisms were proposed.

Mechanism A:



Mechanism B:



Which of the above mechanism(s) can be consistent with the given information about the reaction?

[AIPMT 2007]

- (1) A and B both (2) Neither A nor B
 (3) A only (4) B only

Scan or tap for the full solution



Q.62 Consider the reaction : $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$

The equality relationship between $\frac{d[\text{NH}_3]}{dt}$ and

$-\frac{d[\text{H}_2]}{dt}$ is

[AIPMT 2006]

- (1) $\frac{d[\text{NH}_3]}{dt} = -\frac{d[\text{H}_2]}{dt}$
 (2) $\frac{d[\text{NH}_3]}{dt} = -\frac{1}{3} \frac{d[\text{H}_2]}{dt}$
 (3) $+\frac{d[\text{NH}_3]}{dt} = -\frac{2}{3} \frac{d[\text{H}_2]}{dt}$
 (4) $+\frac{d[\text{NH}_3]}{dt} = -\frac{3}{2} \frac{d[\text{H}_2]}{dt}$

Scan or tap for the full solution



Q.63 The rate of reaction between two reactants A and B decreases by a factor of 4 if the concentration of reactant B is doubled. The order of this reaction with respect to reactant B is

[AIPMT 2005]

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

Scan or tap for the full solution



Q.64 For a first order reaction $\text{A} \longrightarrow \text{B}$ the reaction rate at reactant concentration of 0.01 M is found to be $2.0 \times 10^{-5} \text{ mol L}^{-1} \text{ s}^{-1}$. The half-life period of the reaction is

[AIPMT 2005]

- (1) 30 s (2) 220 s (3) 300 s (4) 347 s

Scan or tap for the full solution



Q.65 The rate of a first order reaction is $1.5 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$ at 0.5 M concentration of the reactant. The half-life of the reaction is

[AIPMT 2004]

- (1) 0.383 min (2) 23.1 min
(3) 8.73 min (4) 7.53 min

Scan or tap for the
full solution



Q.66 The temperature dependence of rate constant (k) of a chemical reaction is written in terms of Arrhenius equation, $k = A \cdot e^{-E^*/RT}$. Activation energy (E^*) of the reaction can be calculated by plotting

[AIPMT 2003]

- (1) k vs T (2) k vs $\frac{1}{\log T}$
(3) $\log k$ vs $\frac{1}{T}$ (4) $\log k$ vs $\frac{1}{\log T}$

Scan or tap for the
full solution



Q.67 The reaction $A \longrightarrow B$ follows first order kinetics. The time taken for 0.8 mole of A to produce 0.6 mole of B is 1 hour. What is the time taken for conversion of 0.9 mole of A to produce 0.675 mole of B ?

[AIPMT 2003]

- (1) 1 hour (2) 0.5 hour
(3) 0.25 hour (4) 2 hours

Scan or tap for the
full solution



Q.68 The activation energy for a simple chemical reaction $A \rightleftharpoons B$ is E_a in forward direction. The activation energy for reverse reaction

[AIPMT 2003]

- (1) is negative of E_a
(2) is always less than E_a
(3) can be less than or more than E_a
(4) is always double of E_a

Scan or tap for the
full solution



Q.69 The radioisotope, tritium (${}^3_1\text{H}$) has a half-life of 12.3 years. If the initial amount of tritium is 32 mg, how many milligrams of it would remain after 49.2 years?

[AIPMT 2003]

- (1) 1 mg (2) 2 mg (3) 4 mg (4) 8 mg

Scan or tap for the
full solution



Q.70 $2A \longrightarrow B + C$

It would be a zero order reaction when

[AIPMT 2002]

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

Scan or tap for the
full solution



Q.71 When a bio-chemical reaction is carried out in laboratory, outside the human body in absence of enzyme, then rate of reaction obtained is 10^{-6} times, the activation energy of reaction in the presence of enzyme is

[AIPMT 2001]

- (1) $6/RT$
(2) P is required
(3) different from E_a obtained in laboratory
(4) can't say anything.

Scan or tap for the
full solution



Q.72 For the reaction;
 $2\text{N}_2\text{O}_5 \longrightarrow 4\text{NO}_2 + \text{O}_2$ rate and rate constant are 1.02×10^{-4} and $3.4 \times 10^{-5} \text{ s}^{-1}$ respectively, then concentration of N_2O_5 at that time will be

[AIPMT 2001]

- (1) 1.732 (2) 3
(3) 1.02×10^{-4} (4) 3.4×10^5

Scan or tap for the
full solution



Q.73 A human body required 0.01 m activity of radioactive substance after 24 hours. Half life of radioactive substance is 6 hours. Then injection of maximum activity of radioactive substance that can be injected is

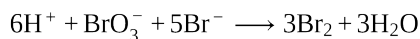
[AIPMT 2001]

- (1) 0.08 (2) 0.04 (3) 0.16 (4) 0.32

Scan or tap for the
full solution



Q.74 For the reaction



which of the following relation correctly represents the consumption and formation of products.

[AIPMT 2000]

$$(1) \frac{d[\text{Br}_2]}{dt} = -\frac{3}{5} \frac{d[\text{Br}^-]}{dt}$$

$$(2) \frac{d[\text{Br}_2]}{dt} = \frac{3}{5} \frac{d[\text{Br}^-]}{dt}$$

$$(3) \frac{d[\text{Br}_2]}{dt} = -\frac{5}{3} \frac{d[\text{Br}^-]}{dt}$$

$$(4) \frac{d[\text{Br}_2]}{dt} = \frac{5}{3} \frac{d[\text{Br}^-]}{dt}$$

Scan or tap for the
full solution



Q.75 A 300 g radioactive sample has a half-life of 3 hours. After 18 hours, the remaining quantity is

[AIPMT 2000]

- (1) 4.68 g (2) 2.34 g (3) 3.34 g (4) 9.37 g

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	4	4	2	4	3	3	2
Ques.	8	9	10	11	12	13	14
Ans.	4	4	1	3	3	3	2
Ques.	15	16	17	18	19	20	21
Ans.	3	3	2	3	2	2	2
Ques.	22	23	24	25	26	27	28
Ans.	3	2	1	2	2	2	3
Ques.	29	30	31	32	33	34	35
Ans.	1	3	2	1	3	1	4
Ques.	36	37	38	39	40	41	42
Ans.	1	1	3	1	2, 4	4	2
Ques.	43	44	45	46	47	48	49
Ans.	2	1	3	4	1	3	2
Ques.	50	51	52	53	54	55	56
Ans.	4	4	4	2	2	2	3
Ques.	57	58	59	60	61	62	63
Ans.	1	3	2	1	4	3	2
Ques.	64	65	66	67	68	69	70
Ans.	4	2	3	1	3	2	2
Ques.	71	72	73	74	75		
Ans.	3	2	3	1	1		