



Test Paper | Class-12 | Chemical Kinetics | Marks 35 | 1.5 h

- 1 What will be the fraction of molecules having energy equal to or greater than activation energy, E_a ? 1
(a) K
(b) A
(c) $Ae^{-E_a/RT}$
(d) $e^{-E_a/RT}$
- 2 3. Which among the following is a false statement? 1
(a) Rate of zero order reaction is independent of initial concentration of reactant.
(b) Half life of a third order reaction is inversely proportional to square of initial concentration of the reactant.
(c) Molecularity of a reaction may be zero or fraction.
(d) For a first order reaction, $t_{1/2}=0.693K$
- 3 4. Which of the following statements about the catalyst is true? 1
(a) A catalyst accelerates the rate of reaction by bringing down the activation energy.
(b) A catalyst does not participate in reaction mechanism.
(c) A catalyst makes the reaction feasible by making ΔG more negative.
(d) A catalyst makes equilibrium constant more favourable for forward reaction
- 4 For the reaction $N_2 + 3H_2 \rightarrow 2NH_3$ if $\Delta[NH_3], \Delta t = 2 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$, the value of $-\Delta[H_2]\Delta t$ would be 1
(a) $1 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$
(b) $3 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$
(c) $4 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$
(d) $6 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$
- 5 For a chemical reaction $A \rightarrow B$, it is found that the rate of reaction doubles when the concentration of A is increased four times. The order of reaction is 1
(a) Two
(b) One
(c) Half
(d) Zero
- 6 In a reaction, $2A \rightarrow \text{Products}$, the concentration of A decreases from 0.5 mol L^{-1} to 0.4 mol L^{-1} in 10 minutes. Calculate the rate during this interval? 2
- 7 The decomposition of NH_3 on platinum surface is zero order reaction. What are the rates of production of N_2 and H_2 if Rate constant $= 2.5 \times 10^{-4} \text{ mol}^{-1} \text{ L s}^{-1}$ 3
- 8 A reaction is first order in A and second order in B. 3



- (i) Write the differential rate equation.
 (ii) How is the rate affected on increasing the concentration of B three times?
 (iii) How is the rate affected when the concentrations of both A and B is doubled
- 9** The half-life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample **3**
- 10** Define **4**
 a) Rate law
 b) Rate constant
 c) collision frequency
 d) Order of reaction
- 11** Give Examples of **2**
 (i) Pseudo unimolecular reaction
 (ii) Zero order
- 12** The rate of the chemical reaction doubles for and increase of 10 K in absolute temperature from 298 K. Calculate E_a **2**
- 13** The following results have been obtained during the kinetic studies of the reaction. **3**
 $2\text{A} + \text{B} \longrightarrow \text{C} + \text{D}$
- | Experiment | [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} |
- Determine the rate law and the rate constant for the reaction
- 14** Calculate the half-life of a first order reaction from their rate constants given below: **2**
 (i) 200 s^{-1} (ii) 2 min^{-1}
 (iii) 4 years^{-1}
- 15** Draw graph **2**
 a) Variation in the Concentration v/s Time Plot for a Zero Order Reaction
 b) A Plot between $\ln[\text{R}]$ and t for a First Order Reaction



Assertion And Reasoning

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

- (a) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
- (b) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
- (c) If the Assertion is correct but Reason is incorrect.
- (d) If both the Assertion and Reason are incorrect.

- 1** Assertion: The order of reaction can be zero or fractional. **1**
Reason: The order of a reaction cannot be determined from a balanced chemical reaction.
- 2** Assertion: The order and molecularity of a reaction are always the same. **1**
Reason: Order is determined experimentally whereas molecularity by a balanced elementary reaction.
- 3** Assertion: Rate constant of a zero-order reaction has the same unit as the rate of a reaction. **1**
Reason: Rate constant of a zero-order reaction does not depend upon the concentration of the reactant.
- 4** Assertion: In a first-order reaction, the concentration of the reactant is doubled, its half-life is also doubled. **1**
Reason: The half-life of a reaction does not depend upon the initial concentration of the reactant in a first-order reaction.