



CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-XII

Subject: Chemistry

Chapter Name : *Chemical Kinetics*

Total : 7 Marks (expected) [MCQ-1 Mark, A/R-1 Marks, VSQ-2 Mark, SQ-3 Marks]

Level - 2

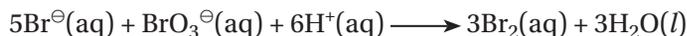
I. MCQ (One correct Answer)

1. Which of the following statements is correct?

- (A) The rate of reaction decreases with passage of time as the concentration of reactants decreases
- (B) The rate of a reaction is same at any time during the reaction
- (C) The rate of a reaction is independent of temperature change
- (D) The rate of a reaction decreases with increase in concentration of reactants.

[Hints : NCERT, Vol-I, Pg-672]

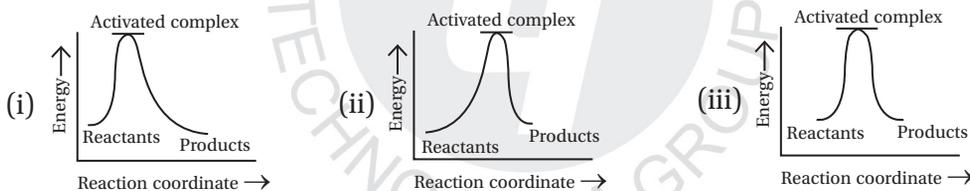
2. Which of the following expression is correct for the rate of reaction given below ?



- (A) $\frac{\Delta[\text{Br}^-]}{\Delta t} = 5 \frac{\Delta[\text{H}^+]}{\Delta t}$
- (B) $\frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{6}{5} \frac{\Delta[\text{H}^+]}{t}$
- (C) $\frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{5}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$
- (D) $\frac{\Delta[\text{Br}^-]}{\Delta t} = 6 \frac{\Delta[\text{H}^+]}{\Delta t}$

[Hints : NCERT, Pg 65]

3. Which of following graphs represents exothermic reaction?



- (A) (i) only
- (B) (ii) only
- (C) (iii) only
- (D) (i) and (ii)

[Hints : NCERT, vol-I, Pg-82]

4. Rate law for the reaction $\text{A} + 2\text{B} \longrightarrow \text{C}$ is found to be

$$\text{Rate} = k [\text{A}] [\text{B}]$$

Concentration of reactant 'B' is doubled, keeping the concentration of 'A' constant, the value of rate constant will be _____ .

- (A) the same
- (B) doubled
- (C) quadrupled
- (D) halved

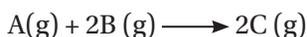
[Hints : NCERT, Pg 67]

5. Which of the following statements is incorrect about the collision theory of chemical reaction ?

- (A) It considers reacting molecules or atoms to be hard spheres and ignored their structural features.
- (B) Number of effective collisions determines the rate of reaction.
- (C) Collision of atoms or molecules possessing sufficient threshold energy results into the product formation
- (D) Molecules should collide with sufficient threshold energy and proper orientation for the collision to be effective.

[Hints : NCERT, Pg 83]

6. A first order reaction is 50% completed in 1.26×10^{14} s. How much time would it take for 100% completion ?
 (A) 1.26×10^{15} s (B) 2.52×10^{14} s (C) 2.52×10^{28} s (D) infinite
7. Compounds 'A' and 'B' react according to the following chemical equation.



Concentration of either 'A' or 'B' were changed keeping the concentrations of one of the reactants constant and rates were measured as a function of initial concentration. Following results were obtained. Choose the correct option for the rate equations for this reaction.

Experiment	Initial concentration of [A]/mol L ⁻¹	Initial concentration of [B]/mol L ⁻¹	Initial rate of formation of [C]/mol L ⁻¹ s ⁻¹
1.	0.30	0.30	0.10
2.	0.30	0.60	0.40
3.	0.30	0.30	0.20

- (A) Rate = $k[A]^2[B]$ (B) Rate = $k[A][B]^2$ (C) Rate = $k[A][B]$ (D) Rate = $k[A]^2[B]^0$

[Hints : NCERT, vol-I, Pg-73-74]

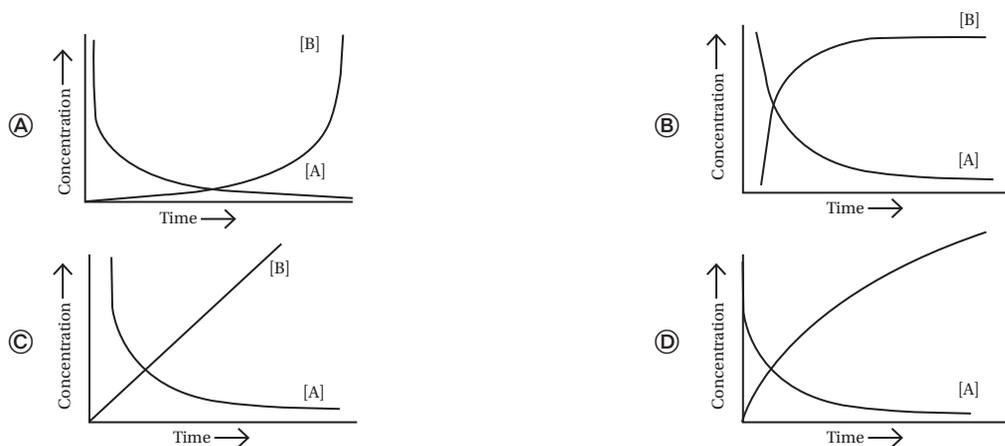
8. Which of the following statement is not correct for the catalyst ?
 (A) It catalyses the forward and backward reaction to the same extent.
 (B) It alters G of the reaction.
 (C) It is a substance that does not change the equilibrium constant of a reaction.
 (D) it provides as alternate mechanism by reducing activation energy between reactants and products.

[Hints : NCERT, vol-I, Pg-82]

9. The value of rate constant of a pseudo first order reaction _____ .
 (A) depends on the concentration of reactants present in small amount.
 (B) depends on the concentration of reactants present in excess.
 (C) is independent of the concentration of reactants.
 (D) depends only on temperature .

[Hints : NCERT, vol-I, Pg-82]

10. Consider the reaction $A = B$. The concentration of both the reactants and the products varies exponentially with time. Which of the following figures correctly describes the change in concentration of reactants and products.



[Hints : NCERT, vol-I, Pg-63]

II. Long Answer Type Questions:**[5 marks each]**

11. (i) Establish the integrated form of rate equation of first order reaction.
 (ii) Show that in the first order reaction, time required for completion of 99.9% is to times of half life period ($t_{1/2}$) of the reaction.

[Hints : NCERT, vol-I, Pg-72]

12. (i) What is pseudo-first order reaction ? Give an example.
 (ii) Define activation energy.
 (iii) The decomposition of ammonia on platinum surface $[2\text{NH}_3(\text{g}) \xrightarrow{\text{Pt}} \text{N}_2(\text{g}) + 3\text{H}_2(\text{g})]$ is a zero order reaction with rate constant, $k = 2.5 \times 10^{-4} \text{ M s}^{-1}$. What are the rates of production of N_2 and H_2 ?

[Hints : NCERT, Vol-1, Pg-78, 79, 80]

13. (a) Define order of reaction. How does order of reaction differ from molecularity for a complex reaction ?
 (b) A first order reaction is 50% complete in 25 minutes. Calculate the time for 80% completion of the reaction.

[Hints : CBSE 2019]

14. (a) The decomposition of a hydrocarbon has value of rate constant as $2.5 \times 10^4 \text{ s}^{-1}$ at 27°C . At what temperature would rate constant be $7.5 \times 10^4 \text{ s}^{-1}$, if energy of activation is $19.147 \times 10^3 \text{ J}(\text{mol})^{-1}$.
 (b) Write a condition under which a bimolecular reaction is kinetically first order. Give an example of such a reaction.

[Hints : CBSE 2019]

15. (a) A first order reaction is 25% complete in 40 minutes. Calculate the value of rate constant. In what time will be reaction be 80% completed ?
 (b) Define order of reaction. Write two conditions for collisions to be effective collision.

[Hints : CBSE 2020]**ANSWER**

1. (A)
 2. (C) ; $\left[-\frac{1}{5} \frac{\Delta(\text{Br}^-)}{\Delta t} = -\frac{1}{6} \frac{\Delta(1+1)}{\Delta t} \right]$
 3. (A)
 4. (A)
 5. (C)
 6. (D) ; It take infinite time for completion
 7. (B) ; $r \propto [\text{B}]^2$; $r \propto [\text{A}]$; $r = k[\text{A}][\text{B}]^2$
 8. (B) ; A catalyst does not change ΔG or ΔH .
 9. (B) ; rate constant depend a code of reaction present
 10. (B)

(II) Long Answer Question

11. —
 12. —
 13. (B) ; 58.11 min.
 14. (A) 350 K.
 15. (A) $K = 7.197 \times 10^{-3} (\text{min})^{-1}$, $t = 223.7 \text{ min}$.