

# Chemical Kinetics

1. **Assertion (A):** The rate of reaction whether exothermic or endothermic, increase with temperature.

**Reason (R):** The rate reaction =  $K[\text{reactant}]^n$  and  $K$  increases with temperature.

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

2. **Assertion (A):** A catalyst always lower the energy of activation.

**Reason (R):** The catalyst-reactant interaction forms activated adsorbed complex and adsorption is always exothermic.

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

3. **Assertion (A):** The catalyst does not affect the heat of reaction.

**Reason (R):** It increases the rate of reaction.

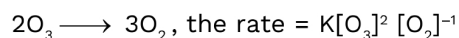
- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

4. **Assertion (A):** The elementary reaction is single step reaction and does not possess mechanism.

**Reason (R):** An elementary reaction has order of reaction and molecularity same.

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

5. **Assertion (A):** For the reaction



**Reason (R):** The reaction has -ve order for  $\text{O}_2$ .

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

6. **Assertion (A):** Order of reaction can never be fractional for an elementary reaction.

**Reason (R):** An elementary reaction takes place by one step mechanism.

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



7. **Assertion (A):** Every collision between molecules does not lead to a chemical reaction.

**Reason (R):** Only those molecules reacts during collisions which acquire threshold energy level.

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

8. **Assertion (A):** Order of the reaction can be zero or fractional.

**Reason (R):** We cannot determine order from balanced chemical equation.

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

9. **Assertion (A):** Order and molecularity are same.

**Reason (R):** Order is determined experimentally and molecularity is the sum of the stoichiometric coefficient of rate determining elementary step.

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

10. **Assertion (A):** The enthalpy of reaction remains constant in the presence of a catalyst.

**Reason (R):** A catalyst participating in the reaction, forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.

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

11. **Assertion (A):** All collision of reactant molecules lead to product formation.

**Reason (R):** Only those collisions in which molecules have correct orientation and sufficient kinetic energy lead to compound formation.

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

12. **Assertion (A):** Order of reaction is an experimental property and irrespective of the fact whether the reaction is elementary or complicated, it is the sum of the powers of the concentration terms appearing in the rate law i.e. experimentally observed rate law.

**Reason (R):** Order of reaction may change with change in experimental conditions.



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

**13. Assertion (A):** If order with respect to species involved in any reaction is equal to the stoichiometric coefficient of that species in the reaction then reaction must be an complex reaction.

**Reason (R):** In a complex reaction the order with respect to species involved is equal to the stoichiometric coefficients.

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

**14. Assertion (A):** If in a zero order reaction, the concentration of the reactant is doubled, the half-life period is also doubled.

**Reason (R):** For a zero order reaction, the rate of reaction is independent of initial concentration.

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

**15. Assertion (A):** The rate of reaction normally increases by a factor of 2 or 3 for every 10° rise in temperature.

**Reason (R):** By increasing the temperature, activation energy decreases.

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

**16. Assertion (A):** For a chemical reaction to occur, there must be collision in between reactant species.

**Reason (R):** All such collisions necessarily convert themselves into product formation

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

### ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ans.	1	1	2	1	2	1	1	2	4	1	4	2	4	2	3	3