

Chemical Kinetics

MCQs

1. Chemical kinetics deals with the _____ of chemical reactions.

Answer: rate

2. The word “kinetics” means _____.

Answer: movement

3. Chemical kinetics studies reaction _____ and mechanism.

Answer: rates

4. Feasibility of a reaction is predicted by _____.

Answer: thermodynamics

5. A reaction is spontaneous when ΔG is _____ than zero.

Answer: less

6. The extent of reaction is determined by _____.

Answer: chemical equilibrium

7. The speed of a chemical reaction is studied in _____.

Answer: chemical kinetics

8. Chemical kinetics tells how _____ a reaction occurs.

Answer: fast

9. Thermodynamics predicts the _____ of a reaction.

Answer: feasibility

10. Diamond converts into graphite very _____.

Answer: slowly

11. Reaction rate means the _____ of a chemical reaction.

Answer: speed

12. Reaction rate is affected by concentration, temperature, and _____.

Answer: catalyst

13. Increasing concentration generally _____ the reaction rate.

Answer: increases

14. Increasing temperature usually _____ the reaction rate.

Answer: increases

15. Pressure mainly affects _____ reactions.

Answer: gaseous

16. Study of reaction mechanism is a part of chemical _____.

Answer: kinetics

17. Collision theory states that reactions occur through collisions of _____.

Answer: molecules

18. Effective collisions require sufficient energy and proper _____.

Answer: orientation

19. Instantaneous rate is measured at a particular _____.

Answer: moment

20. Average rate is calculated over a time _____.

Answer: interval

Short QAs

1. **What is chemical kinetics?**

Chemical kinetics is the branch of chemistry that studies the rate of chemical reactions and the factors affecting them.

2. **What does thermodynamics tell about a reaction?**

Thermodynamics tells whether a reaction is feasible or spontaneous.

3. **What is meant by rate of reaction?**

Rate of reaction is the speed at which reactants are converted into products.

4. **Name any two factors affecting reaction rate.**

Temperature and concentration affect the reaction rate.

5. **What is the effect of temperature on reaction rate?**

Increasing temperature generally increases the reaction rate.

6. **What is the role of a catalyst in a reaction?**

A catalyst increases the rate of reaction by lowering activation energy.

7. **What is collision theory?**

Collision theory states that chemical reactions occur through collisions between reacting molecules.

8. **What are effective collisions?**

Effective collisions are collisions with sufficient energy and proper orientation that lead to product formation.

9. **Differentiate between thermodynamics and chemical kinetics.**

Thermodynamics tells whether a reaction can occur, while chemical kinetics tells how fast it occurs.

10. **Why does diamond convert into graphite very slowly?**

Diamond converts into graphite very slowly because the reaction has very high activation energy.

MCQs

1. **Chemical kinetics deals with:**

- A) Structure of atoms
- B) Rate of chemical reactions
- C) Equilibrium only
- D) Extraction of metals

Answer: B) Rate of chemical reactions

Explanation: Chemical kinetics is the branch of chemistry that studies how fast or slow chemical reactions occur and the factors affecting their rates.

2. **The word “kinetics” is derived from Greek word meaning:**

- A) Energy
- B) Movement
- C) Matter
- D) Change

Answer: B) Movement

Explanation: The Greek word *kinesis* means movement, which relates to the movement and progress of chemical reactions.

3. Chemical kinetics studies:

- A) Reaction rates
- B) Reaction mechanisms
- C) Factors affecting rates
- D) All of these

Answer: D) All of these

Explanation: Chemical kinetics includes the study of reaction speed, reaction pathways (mechanism), and factors like temperature and catalyst affecting the rate.

4. Feasibility of a reaction is predicted

by:

- A) Chemical kinetics
- B) Thermodynamics
- C) Electrochemistry
- D) Surface chemistry

Answer: B) Thermodynamics

Explanation: Thermodynamics tells whether a reaction is possible or spontaneous, not how fast it occurs.

5. A reaction is feasible when:

- A) $\Delta G > 0$
- B) $\Delta G = 0$
- C) $\Delta G < 0$
- D) $\Delta G = 1$

Answer: C) $\Delta G < 0$

Explanation: A negative Gibbs free energy change indicates that the reaction can occur spontaneously.

6. Extent of reaction is determined by:

- A) Thermodynamics
- B) Chemical equilibrium
- C) Spectroscopy
- D) Electrolysis

Answer: B) Chemical equilibrium

Explanation: Chemical equilibrium determines how far a reaction proceeds before reaching a balanced state.

7. **Speed of reaction is studied in:**

- A) Organic chemistry
- B) Chemical kinetics
- C) Coordination chemistry
- D) Nuclear chemistry

Answer: B) Chemical kinetics

Explanation: Chemical kinetics specifically studies the rate or speed of reactions.

8. **Chemical kinetics tells:**

- A) Whether reaction occurs
- B) How fast reaction occurs
- C) Colour of products
- D) Shape of molecules

Answer: B) How fast reaction occurs

Explanation: Kinetics deals with reaction speed, while thermodynamics deals with feasibility.

9. **Thermodynamics tells:**

- A) Rate of reaction
- B) Feasibility of reaction
- C) Mechanism only
- D) Catalyst action only

Answer: B) Feasibility of reaction

Explanation: Thermodynamics predicts whether a reaction is energetically possible.

10. **Diamond converts to graphite:**

- A) Rapidly
- B) Instantly
- C) Very slowly
- D) Explosively

Answer: C) Very slowly

Explanation: Although graphite is thermodynamically more stable, the conversion is extremely slow due to high activation energy.

11. **Rate of reaction means:**

- A) Amount of catalyst used
- B) Speed of chemical reaction
- C) Molecular mass
- D) Heat evolved

Answer: B) Speed of chemical reaction

Explanation: Reaction rate describes how quickly reactants are converted into products.

12. **Which affects reaction rate?**

- A) Concentration
- B) Temperature
- C) Catalyst
- D) All of these

Answer: D) All of these

Explanation: Reaction rate depends on several factors including concentration, temperature, and catalysts.

13. **Increasing concentration generally:**

- A) Decreases rate
- B) Increases rate
- C) Stops reaction
- D) No effect

Answer: B) Increases rate

Explanation: Higher concentration increases the frequency of molecular collisions, increasing reaction rate.

14. **Increasing temperature generally:**

- A) Slows reaction

- B) Increases reaction rate
- C) Stops collisions
- D) Decreases energy

Answer: B) Increases reaction rate

Explanation: Higher temperature increases kinetic energy and effective collisions between molecules.

15. **Pressure mainly affects:**

- A) Solid reactions
- B) Liquid reactions
- C) Gaseous reactions
- D) Nuclear reactions

Answer: C) Gaseous reactions

Explanation: Pressure changes mainly influence gases because gases are highly compressible.

16. **Catalyst generally:**

- A) Decreases rate
- B) Increases rate
- C) Stops reaction
- D) Changes equilibrium constant always

Answer: B) Increases rate

Explanation: A catalyst speeds up reactions by lowering activation energy without changing equilibrium constant.

17. **Study of reaction mechanism is part of:**

- A) Chemical kinetics
- B) Thermodynamics
- C) Qualitative analysis
- D) Metallurgy

Answer: A) Chemical kinetics

Explanation: Reaction mechanism explains the step-by-step pathway of a reaction.

18. **At macroscopic level, we study:**

- A) Molecular collisions
- B) Amount reacted or formed
- C) Electron spin
- D) Atomic radius

Answer: B) Amount reacted or formed

Explanation: Macroscopic study deals with observable quantities like concentration and amount of substances.

19. **At molecular level, kinetics studies:**

- A) Crystal defects
- B) Orientation of molecules
- C) Magnetic moment
- D) Atomic number

Answer: B) Orientation of molecules

Explanation: Proper orientation of molecules is necessary for effective collisions.

20. **Collision theory states reactions occur through:**

- A) Heating only
- B) Collisions of molecules
- C) Electrolysis only
- D) Diffusion only

Answer: B) Collisions of molecules

Explanation: According to collision theory, reacting particles must collide for a reaction to occur.

21. **Effective collision requires:**

- A) Proper orientation
- B) Sufficient energy
- C) Both A and B
- D) Low temperature only

Answer: C) Both A and B

Explanation: Molecules must collide with enough energy and correct orientation to react.