QB365 Question Paper Software
12th Standard - Chemistry
Chemical Kinetics Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-10-01
Total Marks: 10

Questions:

1. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) $\Delta[R]$ is multiplied with -1 to make the rate of the reaction a positive quantity.
Reason (R) $\Delta[R]$ is a negative quantity in the expression, rate of disappearance of $R = \frac{-\Delta[R]}{\Delta t}$
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

2. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) A positive catalyst increases the rate of reaction.
Reason (R) A catalyst increases the rate of reaction by making available a new and more efficient mechanism.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

3. **Assertion :** The molecularity of the reaction, $H_2 + Br_2 \rightarrow 2HBr$ is 2.
Reason : The rate of reaction is given by k $[H_2][Br_2]$
Codes :
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

4. **Assertion :** Hydrolysis of cane sugar is a pseudo first order reaction.
Reason : Water is present in large excess during hydrolysis.
Codes :
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

5. **Assertion :** Kinetics explains the reaction mechanism.
Reason : Kinetics explains the formation of products.
Codes :
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

6. In the following questions a statement of assertion followed by a statement of reason is given.
Assertion: Rate constants determined from Arrhenius equation are fairly accurate for simple as well as complex molecules.
Reason: Reactant molecules undergo chemical change irrespective of their orientation during collision.
Codes:
(a) Both assertion and reason are correct and the reason is correct explanation of assertion.
(b) Both assertion and reason are correct but reason does not explain assertion.
(c) Assertion is correct but reason is incorrect,
(d) Both assertion and reason are incorrect.
(e) Assertion is incorrect but reason is correct.

7. **Assertion (A)** Inversion of configuration is observed when 1-bromobutane is hydrolysed.
Reason (R) The reaction is S_N2 and proceeds with the formation of transition state.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

8. Assertion (A) : Order and molecularity of a reaction are always same.
Reason (R) : Complex reactions involve a sequence of elementary reactions and the slowest step is rate determining.
(a) Both Assertion and Reason are correct, Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct, Reason is not the correct explanation of Assertion.
(c) Assertion is correct; Reason is incorrect.
(d) Assertion is incorrect; Reason is correct.

9. **Assertion:** Molecularity has no meaning for a complex reaction.
Reason: The overall molecularity of a complex reaction is equal to the molecularity of the slowest step.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

10. **Assertion:** The photochemical reactions H2+Cl2→2HCl and H2+Br2→2HBr have equal quantum efficiencies.
Reason: Both the reactions proceed by similar mechanism.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

Answers Key:

1. (a) Rate of disappearance of $R = \frac{-\Delta[R]}{\Delta t}$
Since,$\Delta[R]$ is a negative quantity, it is multiplied with -1 to make the reaction rate a positive quantity. Hence, both (A) and (R) are correct and (R) is the correct explanation of (A).
2. (a) A positive catalyst increases rate of reaction by making a new and more efficient mechanism. Thus, both (A) and (R) are correct and (R) is the correct explanation of (A).
3. (c) : The rate of formation of HBr is directly proportional to the concentration of hydrogen and square root of the concentration of bromine when HBr is not present in the system.
Rate = k $[H_2]$ $[Br_2]^{1/2}$.
4. (a) : Hydrolysis of cane sugar is pseudo first order reaction. Since, water is always in excess, rate of reaction does not depend appreciably on its concentration, thus it is an example of pseudo unimolecular reactions.
5. (a) : Kinetics deals with the reaction mechanism i.e., how the atoms rearrange themselves in the reactant molecules in a single step or a number of steps, finally leading to the product molecules.
6. (c) Assertion is correct but reason is incorrect. For effective collision orientation during collision is irrespective.
7. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
8. (d) Assertion is incorrect; Reason is correct.
Order and molecularity differs in case of complex reactions.
A is incorrect, but R is correct.
9. B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
Explanation:
Molecularity of a reaction can be defined only for an elementary reaction because complex reaction does not take place in one single step and it is almost impossible for all the total molecules of the reactants to be in a state of encounter simultaneously.
10. D) If the assertion and reason both are false.