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**Max Time : 1 hr** **Class = 12th Chemistry Test**  **Max Marks : 25**

**CHEMICAL KINETICS CODE : A**

1. Define specific reaction rate or rate constant. [ 1 ]
2. How does the value of rate constant vary with reactant concentration? [ 1 ]
3. Define the term ‘order of reaction’ for chemical reactions. [ 1 ]
4. Express the relationship between the rate of production of water and the rate of disappearance of oxygen in the reaction : 2 H2 + O2 → 2 H2O. [ 1 ]
5. For a reaction, A → B, the rate of reaction can be denoted by or + , state the significance of plus and minus signs in this case. [ 1 ]
6. The decomposition of NH3 on platinum surface is zero ordered reaction. What are the rates of production of N2 and H2 if k = 2.5 x 10 – 4 mol L – 1 s – 1 . [ 2 ]
7. The rate law for a reaction is found to be : Rate = k [] [ I – ] [H+]2 . How would the rate of reaction change when : [ 2 ]

(i) Concentration of H+ is doubled (ii) Concentration of I – is halved

(iii) Concentration of each of , I –  and H+ are tripled ?

1. A chemical reaction, 2 A → 4 B + C, in gas phase occurs in a closed vessel. The concentration of B is found to be increased by 5 x 10 - 3 mol/L in 10 seconds. Calculate : the rate of disappearance of A. [ 2 ]
2. For a first order reaction, show that time required for 99 % completion is twice the time required for the completion of 90 % of reaction. [ 2 ]
3. The initial rate of reaction A + 5 B + 6 C 3 L + 3 M has been determined by measuring the rate of disappearance of A under the following conditions : [ 3 ]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Expt. No. | [A]0/M | [B]0/M | [C]0/M | Initial rate/M min – 1 |
| 1 | 0.02 | 0.02 | 0.02 | 2.08 x 10 – 3 |
| 2 | 0.01 | 0.02 | 0.02 | 1.04 x 10 – 3 |
| 3 | 0.02 | 0.04 | 0.02 | 4.16 x 10 – 3 |
| 4 | 0.02 | 0.02 | 0.04 | 8.32 x 10 – 3 |

Determine the order of reaction with respect to each reactant and overall order of reaction. What is the rate constant? Calculate the initial rate of change in concentration of B and L.

1. Differentiate between rate of reaction and reaction rate constant. [ 3 ]
2. Calculate the half-life of a first order reaction from their rate constants given below : [ 3 ]

(i) 200 s – 1 (ii) 2 min – 1 (iii) 4 years – 1

1. For the decomposition of dinitrogen pentoxide at 200˚C , N2O5 (g) N2O4 (g) + O2 (g), if the initial pressure is 114 mm and after 25 minutes of the reaction, total pressure of the gaseous mixture is 133 mm, calculate the average rate of reaction in : (a) atm min– 1

b) mol L – 1 s – 1 [ 3 ]

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**Max Time : 1 hr** **Class = 12th Chemistry Test**  **Max Marks : 25**

**CHEMICAL KINETICS CODE : B**

1. For a reaction, A → B, the rate of reaction can be denoted by or + , state the significance of plus and minus signs in this case. [ 1 ]
2. Define the term ‘order of reaction’ for chemical reactions. [ 1 ]
3. Express the relationship between the rate of production of water and the rate of disappearance of oxygen in the reaction : 2 H2 + O2 → 2 H2O. [ 1 ]
4. Define specific reaction rate or rate constant. [ 1 ]
5. How does the value of rate constant vary with reactant concentration? [ 1 ]
6. A chemical reaction, 2 A → 4 B + C, in gas phase occurs in a closed vessel. The concentration of B is found to be increased by 5 x 10 - 3 mol/L in 10 seconds. Calculate : the rate of disappearance of A. [ 2 ]
7. The decomposition of NH3 on platinum surface is zero ordered reaction. What are the rates of production of N2 and H2 if k = 2.5 x 10 – 4 mol L – 1 s – 1 . [ 2 ]
8. For a first order reaction, show that time required for 99 % completion is twice the time required for the completion of 90 % of reaction. [ 2 ]
9. The rate law for a reaction is found to be : Rate = k [] [ I – ] [H+]2 . How would the rate of reaction change when : [ 2 ]

(i) Concentration of H+ is doubled (ii) Concentration of I – is halved

(iii) Concentration of each of , I –  and H+ are tripled ?

1. For the decomposition of dinitrogen pentoxide at 200˚C , N2O5 (g) N2O4 (g) + O2 (g), if the initial pressure is 114 mm and after 25 minutes of the reaction, total pressure of the gaseous mixture is 133 mm, calculate the average rate of reaction in: (a) atm min– 1

b) mol L – 1 s – 1 [ 3 ]

1. Calculate the half-life of a first order reaction from their rate constants given below : [ 3 ]

(i) 200 s – 1 (ii) 2 min – 1 (iii) 4 years – 1

1. The initial rate of reaction A + 5 B + 6 C 3 L + 3 M has been determined by measuring the rate of disappearance of A under the following conditions :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Expt. No. | [A]0/M | [B]0/M | [C]0/M | Initial rate/M min – 1 |
| 1 | 0.02 | 0.02 | 0.02 | 2.08 x 10 – 3 |
| 2 | 0.01 | 0.02 | 0.02 | 1.04 x 10 – 3 |
| 3 | 0.02 | 0.04 | 0.02 | 4.16 x 10 – 3 |
| 4 | 0.02 | 0.02 | 0.04 | 8.32 x 10 – 3 |

Determine the order of reaction with respect to each reactant and overall order of reaction. What is the rate constant? Calculate the initial rate of change in concentration of B and L.

1. Differentiate between rate of reaction and reaction rate constant. [ 3 ]