TOPIC : CHEMICAL KINETICS **LECTURE-01**

1. In a catalytic reaction involving the formation of ammonia by Haber's process $N_2 + 3H_2 \rightarrow 2NH_3$ the rate of appearance of NH_3 was measured as 2.5×10^{-4} mole L^{-1} s^{-1} The rate of disappearance of H_2 will be –

(1) 2.5×10^{-4} mol L^{-1} s^{-1}
(2) 1.25×10^{-4} mol L^{-1} s^{-1}
(3) 3.75×10^{-4} mol L^{-1} s^{-1}
(4) 5×10^{-4} mol L^{-1} s^{-1}

2. Rate of formation of SO_3 according to the reaction $2SO_2+O_2 \rightarrow 2SO_3$ is 1.6×10^{-3} kg L^{-1} min^{-1} Hence rate of decomposition of SO_2 is :–

(1) 1.6×10^{-3} kg L^{-1} min^{-1}
(2) 8.0×10^{-4} kg L^{-1} min^{-1}
(3) 3.2×10^{-3} kg L^{-1} min^{-1}
(4) 1.28×10^{-3} kg L^{-1} min^{-1}

3. In the reaction

$BrO_3^-(aq) + 5Br^-(aq) + 6H^+ \rightarrow 3Br_2(\ell) + 3H_2O(l)$

The rate of appearance of bromine (Br_2) is related to rate of disappearance of bromide ions as following :-

(1) $\frac{d[Br_2]}{dt} = \frac{3}{5}\frac{d[Br^-]}{dt}$ (2) $\frac{d[Br_2]}{dt} = -\frac{3}{5}\frac{d[Br^-]}{dt}$

(3) $\frac{d[Br_2]}{dt} = -\frac{5}{3}\frac{d[Br^-]}{dt}$ (4) $\frac{d[Br_2]}{dt} = \frac{5}{3}\frac{d[Br^-]}{dt}$

4. For the reaction $N_2O_5(g) \rightarrow 2NO_2(g) + \frac{1}{2}O_2(g)$ the value of rate of disappearance of N_2O_5 is given as 6.25×10^{-3} mol $L^{-1}s^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as :-

(1) 1.25×10^{-2} mol $L^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$
(2) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$
(3) 1.25×10^{-2} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$
(4) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$

5. In a reaction A + B $\rightarrow$ Product, rate is doubled when the concentration of B is doubled and rate increased by a factor of 8 when the concentrations of both the reactants (A and B) are doubled, rate law for the reaction can be written as:

(1) Rate = k[A][B] (2) Rate = $k[A]^2[B]$
(3) Rate = $k[A][B]^2$ (4) Rate = $k[A]^2[B]^2$

6. For reaction aA $\rightarrow$ xP. When [A] is 2.2 mM, the rate was found to be 2.4 mMs^{-1}. On reducing concentration of A to half, the rate changes to 0.6 mMs^{-1}. The order of reaction with respect to A is :

(1) 1.5 (2) 2.0
(3) 2.5 (4) 3.0

7. For any chemical reaction, chemists try to find out

(1) the feasability of a chemical reaction which can be predicted by thermodynamics
(2) speed of a reaction
(3) extent to which a reaction will proceed can be determined
(4) All of the above

8. For a reaction r = $K[A]^{3/2}$ then unit of rate of reaction and rate constant respectively :-

(1) $molL^{-1}$ s^{-1}, $mol^{-1/2}$ $L^{1/2}$ s^{-1}
(2) $mol^{-1}L^{-1}s^{-1}$, $mol^{-1/2}$ $L^{1/2}$ s^{-1}
(3) $molL^{-1}s^{-1}$, $mol^{+1/2}$ $L^{1/2}$ s^{-1}
(4) mol, $mol^{+1/2}$ $L^{1/2}$ s

9. The rate of reaction is expressed

$$+\frac{1}{2}\frac{d[C]}{dt} = -\frac{1}{3}\frac{d[D]}{dt} = +\frac{1}{4}\frac{d[A]}{dt} = \frac{-d[B]}{dt}$$

the reaction is

(1) 4A + B $\rightarrow$2C +3D
(2) B + 3D $\rightarrow$ 4A + 2C
(3) A+B$\rightarrow$ C+D
(4) B+D$\rightarrow$ A+C