Date Planned : __ / __ / __	**Daily Tutorial Sheet-1**	**Expected Duration : 90 Min**
Actual Date of Attempt : __ / __ / __	**JEE Main (Archive)**	**Exact Duration :________**

1. Units of rate constant of first-and zero-order reactions in terms of molarity M are respectively : **(2002)**

(A) S^{-1}, $ML^{-1}\ S^{-1}$ **(B)** S^{-1}, M

(C) MS^{-1}, S^{-1} **(D)** M, S^{-1}

2. For a reaction $A + 2B \longrightarrow C$, rate is given by $R = k[A][B]^2$. The order of reaction is : **(2002)**

(A) 3 **(B)** 6

(C) 5 **(D)** 7

3. The differential rate law for the reaction, **(2002)**

$H_2 + I_2 \rightleftharpoons 2HI$ is :

(A) $\frac{-d[H]_2}{dt} = \frac{-d[I_2]}{dt} = \frac{-d[HI]}{dt}$ **(B)** $\frac{d[H]_2}{dt} = \frac{d[I_2]}{dt} = \frac{d[HI]}{dt}$

(C) $\frac{1}{2}\frac{d[H_2]}{dt} = \frac{1}{2}\frac{d[I_2]}{dt} = \frac{-d[HI]}{dt}$ **(D)** $-2\frac{d[H_2]}{dt} = -2\frac{d[I_2]}{dt} = \frac{d[HI]}{dt}$

4. Which one is correct for $k = Ae^{-E_a/RT}$ **(2003)**

(A) E_a is energy of activation **(B)** R is Rydberg constant

(C) k is equilibrium constant **(D)** A is adsorption factor

5. The rate law for a reaction between the substances A and B is given by rate = k $[A]^n[B]^m$. On doubling the concentration of A and halving the concentration of B, the ratio of the new rate to the earlier rate of the reaction will be as: **(2003)**

(A) $\frac{1}{2^{m+n}}$ **(B)** $(m + n)$ **(C)** $(n - m)$ **(D)** $2^{(n - m)}$

6. In a first-order reaction, the concentration of the reactant decreases from 0.8 M to 0.4 M in 15 minutes. The time taken for the concentration to change from 0.1 M to 0.025 M is : **(2004)**

(A) 60 minutes **(B)** 15 minutes

(C) 7.5 minutes **(D)** 30 minutes

7. Consider an endothermic reaction, $X \longrightarrow Y$ with the activation energies E_b and E_f for the backward and forward reactions, respectively. In general : **(2005)**

(A) $E_b < E_f$ **(B)** $E_b > E_f$

(C) $E_b = E_f$ **(D)** There is no definite relation between E_b and E_f

8. A reaction involving two different reactants can never be : **(2005)**

(A) Unimolecular reaction **(B)** First order reaction

(C) second order reaction **(D)** Bimolecular reaction

9. $t_{1/4}$ can be taken as the time taken for concentration of reactant to drop to ¾ of its initial value. If the rate constant for a first-order reaction is k, then $t_{1/4}$ can be written as : **(2005)**

(A) 0.10/k **(B)** 0.29/k **(C)** 0.69/k **(D)** 0.75/k

10. A reaction was found to be second order with respect to the concentration of carbon monoxide. If the concentration of carbon monoxide is doubled, with everything else kept the same, the rate of reaction will **(2006)**

(A) remain unchanged **(B)** triple
(C) increase by a factor of 4 **(D)** double

11. Rate of a reaction can be expressed by Arrhenius equation as : $k = Ae^{-E/RT}$ **(2006)**
In this equation, E represents :

(A) the energy above which all the colliding molecules will react
(B) the energy below which colliding molecules will not react
(C) the total energy of the reacting molecules at a temperature, T
(D) the fraction of molecules with energy greater than the activation energy of the reaction

12. The following mechanism has been proposed for the reaction of NO with Br_2 to form NOBr **(2006)**

$$NO(g) + Br_2(g) \rightleftharpoons NOBr_2(g)\ ;\ NOBr_2(g) + NO(g) \longrightarrow 2NOBr(g)$$

If the second step is the rate determining step, the order of the reaction with respect to NO(g) is :

(A) 1 **(B)** 0 **(C)** 3 **(D)** 2

13. Consider the reaction, $2A + B \rightarrow$ Products **(2007)**
When concentration of B alone was doubled, the half-life did not change. When the concentration of A alone was doubled, the rate increased by two times. The unit of rate constant for this reaction is:

(A) $L\ mol^{-1}\ s^{-1}$ **(B)** no unit **(C)** $mol\ L^{-1}\ s^{-1}$ **(D)** s^{-1}

14. The energies of activation for forward and reverse reactions for $A_2 + B_2 \rightleftharpoons 2AB$ are 180 kJ mol^{-1} and 200 kJ mol^{-1} respectively. The presence of catalyst lowers the activation energy of both (forward and reverse) reactions by 100 kJ mol^{-1}. The enthalpy change of the reaction $(A_2 + B_2 \rightarrow 2AB)$ in the presence of catalyst will be (in kJ mol^{-1}) : **(2007)**

(A) 300 **(B)** 120 **(C)** 280 **(D)** –20

15. For a reaction $\frac{1}{2}A \rightarrow 2B$, rate of disappearance of 'A' is related to the rate of appearance of 'B' by the expression: **(2008)**

(A) $-\frac{d[A]}{dt} = \frac{1}{2}\frac{d[B]}{dt}$ **(B)** $-\frac{d[A]}{dt} = \frac{1}{4}\frac{d[B]}{dt}$
(C) $-\frac{d[A]}{dt} = \frac{d[B]}{dt}$ **(D)** $-\frac{d[A]}{dt} = 4\frac{d[B]}{dt}$