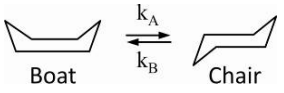
Date Planned : __ / __ / __	Daily Tutorial Sheet-10	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-2	Exact Duration :_____

116. Consider the following reaction. The reaction is first order in each direction, with an equilibrium constant of 10^4. For the conversion of chair form to boat form, $e^{-Ea/RT} = 4.35 \times 10^{-8}$ at 298 K with pre-exponential factor of $10^{12} s^{-1}$. Apparent rate constant (k_A) at 298 K is :



(A) $4.35 \times 10^4 s^{-1}$ **(B)** $4.35 \times 10^8 s^{-1}$ **(C)** $4.35 \times 10^{-8} s^{-1}$ **(D)** $4.35 \times 10^{12} s^{-1}$

117. If $-\left(\frac{dN}{dt}\right)_o$ is the initial activity and $-\left(\frac{dN}{dt}\right)$ is the activity at time t in a radioactive disintegration then :

(A) $-\left(\frac{dN}{dt}\right)_o = -\left(\frac{dN}{dt}\right)e^{-kt}$ **(B)** $-\left(\frac{dN}{dt}\right)_o = \left(\frac{dN}{dt}\right)_o e^{-kt}$

(C) $-\left(\frac{dN}{dt}\right) = -\left(\frac{dN}{dt}\right)_o e^{-kt}$ **(D)** $-\left(\frac{dN}{dt}\right)_o = \left(\frac{dN}{dt}\right)_o e^{-kt}$

118. For the second order reaction, concentration (x) of the product at time t starting with initial concentration $[A]_o$ is :

(A) $\frac{kt[A_o]^2}{1+kt[A_o]}$ **(B)** $\frac{k+[A_o]^2}{1+kt}$

(C) $\frac{1+kt[A_o]^2}{k+[A_o]^2}$ **(D)** None of these

119. Consider following two competing first order reactions, $P \xrightarrow{k_1} A + B$; $Q \xrightarrow{k_2} C + D$ if 50% of the reaction of P was completed when 96 % of Q was completed, then the ratio (k_2 / k_1) will be:

(A) 4.6 **(B)** 4.06

(C) 1.123 **(D)** 2.303

120. Which of the following is pseudo-unimolecular reaction ?

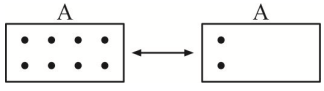
(A) $2H_2O_2 \longrightarrow 2H_2O + O_2$

(B) $C_6H_4N_2Cl + HOH \longrightarrow C_6H_5OH + N_2 + HCl$

(C) $CH_3COOC_2H_5 + NaOH \longrightarrow CH_3COONa + C_2H_5OH$

(D) $2O_3 \longrightarrow 3O_2$

121. If the rate law is $-\frac{d[A]}{dt} = k[A]$



State I, at t = 0 state II, after 12 min

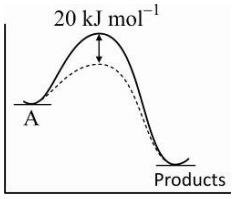
What is half-life period ?

122. For the following reaction,

$$A \xrightarrow{500\,K} \text{Products}$$

$$A \xrightarrow{400\,K/\text{catalyst}} \text{Product}$$

If $\left(\frac{-d[A]}{dt}\right)_{500\,K} = -\left(\frac{d[A]}{dt}\right)_{400\,K}$



no catalyst in presence of catalyst

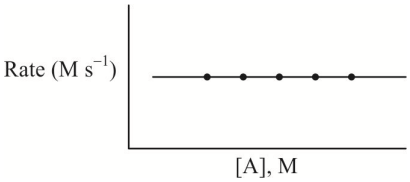
Then E_a is approximately :

(A) $200\,kJ\,mol^{-1}$ **(B)** $100\,kJ\,mol^{-1}$

(C) $20\,kJ\,mol^{-1}$ **(D)** $120\,kJ\,mol^{-1}$

123. Following reaction can take place in both direction $A \underset{k_2}{\overset{k_1}{\rightleftharpoons}} B$. For the forward reaction and for the backward direction

[B]	Rate
0.01 M	$1\times10^{-2}\,M\,s^{-1}$
0.02 M	$2\times10^{-2}\,M\,s^{-1}$



Hence, net reaction rate is :

(A) $= k_1[A] - k_2[B]$ **(B)** $= k_1 - k_2[B]$

(C) $= k_1[A] - k_2$ **(D)** $= k_1 - k_2$

124. The rate constant for the reaction in gaseous phase

$$O + O_3 \longrightarrow 2O_2$$

is $8.0\times10^{-15}\,cm^3\,molecule^{-1}\,s^{-1}$ at 298 K. Corresponding value in $dm^3\,mol^{-1}\,s^{-1}$ is :

(A) $4.8\times10^{6}\,dm^3\,mol^{-1}\,s^{-1}$ **(B)** $1.33\times10^{-6}\,dm^3\,mol^{-1}\,s^{-1}$

(C) $4.8\times10^{8}\,dm^3\,mol^{-1}\,s^{-1}$ **(D)** $1.33\times10^{6}\,dm^3\,mol^{-1}\,s^{-1}$

125. The rate constant is numerically the same for three reactions of first, second and third order respectively. Which one is true for the rates of the three reactions if the concentration of the reactant is greater than 1 M ?

(A) $r_1 = r_2 = r_3$ **(B)** $r_1 > r_2 > r_3$ **(C)** $r_1 < r_2 < r_3$ **(D)** All of these