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EX.18 Consider a gaseous reaction, the rate of which is given by $K[X][Y]$, the Volume of the reaction vessel containing these gases is suddenly increased to 3rd of the initial Volume. The rate of reaction relative to the original rate would be

(A) 9/1 (B) 1/3 (C) 6/1 (D) 1/6

Sol^n: By increasing Volume to 3rd the Concentration will become $\frac{1}{3}$ times, hence rate $\frac{1}{9}$ times

Hence, (B) is the Correct answer.

EX.19 The rate Constant for the reaction, $2N_2O_5 \longrightarrow 4NO_2 + O_2$, is $4.0\ 10^{-5}\ sec^{-1}$. If the rate of reaction is $4.80\ 10^{-5}\ mol\ L^{-1}\ sec^{-1}$ the Concentration of N_2O_5 ($mol\ L^{-1}$) is:

(A) 1.4 (B) 1.2 (C) 0.04 (D) 0.8

Sol^n $r = K[N_2O_5]$

$$\therefore [N_2O_5] = \frac{r}{k} = \frac{4.80 \times 10^{-5}}{4.0 \times 10^{-5}} = 1.2 \text{ mol L}^{-1}$$

Hence, (B) is the correct answer.

Ex. 20 The rate constant, the activation energy and the Arrhenius parameter of a chemical reaction at 25C are $2\ 10^{-4}\ s^{-1}$, 114.4 kJ mol^{-1} and $6.0\ 10^{14}\ s^{-1}$ respectively, the value of the rate constant at $T \to \infty$ is.

(A) $2.0\ 10^{18}\ s^{-1}$ (B) $3.6\ 10^{30}\ s^{-1}$ (C) ∞ (D) $6.0\ 10^{14}\ s^{-1}$

Sol: $K = Ae^{-Ea/RT}$

when $T \to \infty$

$K \to A$

$A = 6\ 10^{14}\ s^{-1}$

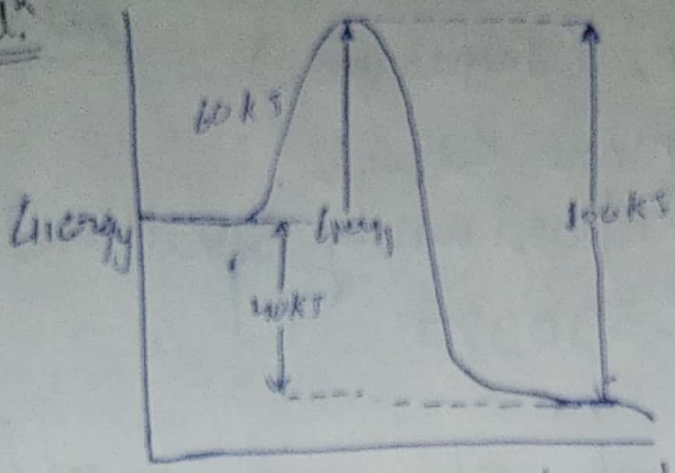
Hence, (D) is the correct answer.

Ex. 21 If reaction $A + B \longrightarrow C$, is exothermic to the extant of 40 kJ/mol and the forward reaction has an activation energy 60 kJ/mol the activation energy for the reverse reaction is

(A) 30 kJ/mol (B) 40 kJ/mol (C) 70 kJ/mol

(D) 100 kJ/mol

Sol.



Activation energy for backward reaction = 100 KJ

Hence, (D) is is Correct answer.

Ex.22 The rate of reaction is doubled for every 10 rise in temperature. The increase in reaction rate as a result of temperature rise from 10 to 100 is.

(A) 112 (B) 512 (C) 400 (D) 614

Sol. Increase in steps of 10 has been made 9 times. Hence, rate of reaction should increase 2^9 times i.e., 512 times.

Hence, (B) is the Correct answer.

Ex.23 Van't Hoff equation is

(A) $(d/dT)\ln k = (-\Delta E/RT^2)$

(B) $(d/dT)\ln k = +(E/RT^2)$

(C) $(d/dT)\ln k = -(\Delta E/RT)$

(D) $K = Ae^{-Ea/RT}$

Sol. (B) and (D)