Chemical Kinetics

SET Self Evaluation Test -11

1. The temperature coefficient of most of the reactions lies between [MP PET 1999]

(a) 1 and 3 (b) 2 and 3

(c) 1 and 4 (d) 2 and 4

2. The influence of temperature on the rate of reaction can be found out by **[AFMC 2001]**

(a) Clapeyron–Claussius equation

(b) Gibbs–Helmholtz equation

(c) Arrhenius equation

(d) Vander Waal's equation

3. The mechanism for the reaction is given below

$2P + Q \rightarrow S + T$

$P + Q \rightarrow R + S$ (slow)

$P + R \rightarrow T$ (fast)

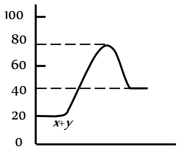
The rate law expression for the reaction is

[**Kurukshetra CEE 2002**]

(a) $r = k[P]^2[Q]$ (b) $r = k[P][Q]$

(c) $r = k[A][R]$ (d) $r = k[P]^2$

4. Consider the following energy profile for the reaction. $X + Y = R + S$. Which of the following deductions about the reaction is not correct



(a) The energy of activation for the backward reaction is 80 *kJ*

(b) The forward reaction is endothermic

(c) ΔH for the forward reaction is 20 *kJ*

(d) The energy of activation for the forward reaction is 60 *kJ*

5. The minimum energy required for molecules to enter into the reaction is called

[KCET 1986; EAMCET 1992; MP PMT 1993; MP PET 1994]

(a) Potential energy

(b) Kinetic energy

(c) Nuclear energy

(d) Activation energy

6. The minimum energy necessary to permit a reaction is

[NCERT 1989]

(a) Internal energy

(b) Threshold energy

(c) Activation energy

(d) Free energy

7. The formation of gas at the surface of tungsten due to adsorption is the reaction of order **[AIEEE 2002]**

(a) 0

(b) 1

(c) 2

(d) insufficient data

8. The time of completion of 90% of a first order reaction is approximately **[MP PET 2002]**

(a) 1.1 times that of half life

(b) 2.2 times that of half life

(c) 3.3 times that of half life

(d) 4.4 times that of half life

9. In a photochemical reaction, the ratio of number of dissociate molecules and number of quanta of absorbed energy is called

(a) Einstein

(b) Quantum efficiency

(c) Quantum constant

(d) Planck constant

10. A reaction rate constant is given by

$k = 1.2 \times 10^{14}\, e^{-(25000\,/\,RT)}\ \sec^{-1}$

It means **[MP PET 1995]**

(a) $\log k$ versus $\log T$ will give a straight line with slope as –25000

(b) $\log k$ versus T will give a straight line with slope as –25000

(c) $\log k$ versus $\log 1/T$ will give a straight line with slope as –25000

(d) $\log k$ versus $1/T$ will give a straight line

AS Answers and Solutions

(SET -11)

1. (b) Temperature coefficient = $\frac{K_{35^oC}}{K_{25^oC}}$ = between 2 and 3.

2. (c) Arrihenius equation is : $K = Ae^{-E_a/RT}$

3. (b) The rate law expression for the reaction is $r = k[P][Q]$.

4. (a) E_a of backward reaction $= 80 - 40 = 40kJ$

   Hence (a) statement is wrong.

5. (d) The energy necessary for molecules to undergoes chemical reaction is known as Activation energy.

6. (b) Molecules undergoing reaction should cross over the minimum energy barrier or energy level known as threshold energy.

7. (a) The order of reaction for the formation of gas at the surface of tungsten due to adsorption is zero .

8. (c) For a first order reaction

$$K = \frac{2.303}{t}\log\frac{a}{(a-x)}$$

$$t = \frac{2.303}{k}\log\frac{100}{(100-90)} = \frac{2.303 \times t_{1/2}}{0.593} \times \log\frac{100}{10}$$

$$= 3.3 \times t_{1/2} \times \log 10 = 3.3\ t_{1/2}$$

9. (b) It is also known as Quantum yield and indicated by ϕ .

10. (d) According to the Arrihenius equation a straight line is to be `obtained by plotting the logarithm of the rate constant of a chemical reaction (log *K*) against 1/*T*.

***