# EXERCISE-I

## Rate of a reaction

**1.** Time required for completion of ionic reactions in comparison to molecular reactions is
(A) Maximum (B) Minimum
(C) Equal (D) None

**2.** For reaction $2A+B\rightarrow$ products, the active mass of $B$ is kept constant and that of $A$ is doubled. The rate of reaction will then
(A) Increase 2 times (B) Increase 4 times
(C) Decrease 2 times (D) Decrease 4 times

**3.** In a reaction $2A+B\rightarrow A_2B$, the reactant $A$ will disappear at
(A) Half the rate that $B$ will decrease
(B) The same rate that $B$ will decrease
(C) Twice the rate that $B$ will decrease
(D) The same rate that $A_2B$ will form

**4.** The rate of a gaseous reaction is given by the expression $K[A][B]$. If the volume of the reaction vessel is suddenly reduced to 1/4th of the initial volume, the reaction rate relating to original rate will be
(A) 1/10 (B) 1/8
(C) 8 (D) 16

**5.** A catalyst increases the rate of reaction because it
(A) Increases the activation energy
(B) Decreases the energy barrier for reaction
(C) Decreases the collision diameter
(D) Increases the temperature coefficient

**6.** The velocity of the chemical reaction doubles every $10^oC$ rise of temperature. If the temperature is raised by $50^oC$, the velocity of the reaction increases to about
(A) 32 times (B) 16 times
(C) 20 times (D) 50 times

**7.** An increase in temperature by $10^oC$, generally increases the rate of a reaction by
(A) 2 times (B) 10 times
(C) 9 times (D) 100 times

**8.** The temperature coefficient for reaction in which food deteriorates is 2. Then food deteriorates ...... times as rapidly at $25^oC$ as it does at $5^oC$
(A) Two (B) Four
(C) Six (D) Twenty

**9.** The rate of a reaction is doubled for every $10^o$ rise in temperature. The increase in reaction rate as a result of temperature rise from $10^o$ to $100^o$ is
(A) 112 (B) 512
(C) 400 (D) 614

**10.** A catalyst increases the rate of a chemical reaction by
(A) Increasing the activation energy
(B) Decreasing the activation energy
(C) Reacting with reactants
(D) Reacting with products

**11.** A reaction is catalysed by '$X$'. Here '$X$'
(A) Decreases the rate constant of reaction
(B) Does not affect the equilibrium constant of reaction
(C) Decreases the enthalpy of reaction
(D) Decreases the activation energy

**12.** Which reaction characteristics are changing by the addition of a catalyst to a reaction at constant temperature
(i) Activation energy
(ii) Equilibrium constant
(iii) Reaction entropy
(iv) Reaction enthalpy
(A) (i) Only (B) (iii) only
(C) (i) and (ii) only (D) All of these

**13.** The velocity constant of a reaction at 290 $K$ was found to be $3.2\times10^{-3}$. At 300 $K$ it will be
(A) $1.28\times10^{-2}$ (B) $6.4\times10^{-3}$
(C) $9.6\times10^{-3}$ (D) $3.2\times10^{-4}$

**14.** In which of the following cases, does the reaction go farthest to completion

(A) $K = 10^3$ (B) $K = 10^{-2}$

(C) $K = 10$ (D) $K = 1$

**15.** Rate of reaction

(A) Decreases with increase in temperature

(B) Increases with increase in temperature

(C) May increase or decrease with increase in temperature

(D) Does not depend on temperature

## Rate law and Rate constant

**16.** The velocity constant of a reaction is *K*. Which of the following statements is not true regarding *K*

(A) *K* is a constant for a reaction at a given temperature

(B) The value of *K* changes when the temperature changes

(C) *K* is the velocity of the reaction at unit concentrations of the reactant

(D) *K* is a constant for all reactions

**17.** For the following reaction scheme (homogeneous), the rate constant has units :

$A + B \xrightarrow{K} C$

(A) $\sec^{-1} mole$ (B) $\sec^{-1}$

(C) $\sec^{-1} litre\ mole^{-1}$ (D) $sec$

**18.** Which of the following oxides of nitrogen will be the most stable one

(A) $2NO_2(g) \rightleftharpoons N_2(g) + 2O_2(g); K = 6.7\times10^{16}\, mol\, l^{-1}$

(B) $2NO(g) \rightleftharpoons N_2(g) + O_2(g); K = 2.2\times10^{30}\, mol\, l^{-1}$

(C) $2N_2O_5(g) \rightleftharpoons 2N_2(g) + 5O_2(g); K = 1.2\times10^{34}\, mol\, l^{-5}$

(D) $2N_2O(g) \rightleftharpoons 2N_2(g) + O_2(g); K = 3.5\times10^{33}\, mol\, litre^{-1}$

**19.** The rate of reaction is determined by slow step reaction. The step is called

(A) Reaction rate

(B) Activation step

(C) Rate determining step

(D) None of the above

**20.** The rate of the reaction $CCl_3CHO + NO \rightarrow CHCl_3 + NO + CO$ is given by Rate $= K[CCl_3CHO][NO]$. If concentration is expressed in moles/litre, the units of *K* are

(A) $litre^2\, mole^{-2} \sec^{-1}$ (B) $mole\, litre^{-1} \sec^{-1}$

(C) $litre\, mole^{-1} \sec^{-1}$ (D) $\sec^{-1}$

**21.** Rate constant for a reaction $H_2 + I_2 \rightarrow 2HI$ is 49, then rate constant for reaction $2HI \rightarrow H_2 + I_2$ is

(A) 7 (B) 1/49

(C) 49 (D) 21

**22.** The reaction

$$N_2O_5\,(\text{in}\, CCl_4\, \text{solution}) \rightarrow 2NO_2(\text{solution}) + \frac{1}{2}O_2(g)$$

is of first order in $N_2O_5$ with rate constant $6.2\times10^{-1} s^{-1}$. What is the value of rate of reaction when $[N_2O_5] = 1.25\, mole\, l^{-1}$

(A) $7.75\times10^{-1} mole\, l^{-1} s^{-1}$

(B) $6.35\times10^{-3} mole\, l^{-1} s^{-1}$

(C) $5.15\times10^{-5} mole\, l^{-1} s^{-1}$

(D) $3.85\times10^{-1} mole\, l^{-1} s^{-1}$

**23.** A reaction that is of the first order with respect to reactant *A* has a rate constant $6 \min^{-1}$. If we start with $[A] = 0.5\, mol\ l^{-1}$, when would $[A]$ reach the value 0.05*mol* $l^{-1}$

(A) 0.384 *min* (B) 0.15 *min*

(C) 3 *min* (D) 3.84 *min*

**24.** The rate constant for the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$ is $3\times10^{-5} \sec^{-1}$. If the rate is $2.40\times10^{-5} mol\ litre^{-1} \sec^{-1}$. Then the concentration of $N_2O_5$ (in *mol litre*$^{-1}$) is

(A) 1.4 (B) 1.2

(C) 0.04 (D) 0.8

**25.** For the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$ rate of reaction and rate constant are $1.02\times10^{-4}$ and $3.4\times10^{-5}\sec^{-1}$ respectively. The concentration of $N_2O_5$ at that time will be

(A) 1.732 (B) 3

(C) $1.02\times10^{-4}$ (D) $3.4\times10^{5}$

**26.** The unit of rate constant for a zero order reaction is

(A) $litre\ \sec^{-1}$ (B) $litre\ mole^{-1}\sec^{-1}$

(C) $mole\ litre^{-1}\sec^{-1}$ (D) $mole\ \sec^{-1}$

**27.** Which of the following rate laws has an overall order of 0.5 for reaction involving substances $x$, $y$ and $z$

(A) Rate $= K(C_x)(C_y)(C_z)$

(B) Rate $= K(C_x)^{0.5}(C_y)^{0.5}(C_z)^{0.5}$

(C) Rate $= K(C_x)^{1.5}(C_y)^{-1}(C_z)^{0}$

(D) Rate $= K(C_x)(C_z)^{n}/(C_y)^{2}$

**28.** The rates of a certain reaction (*dc/dt*) at different times are as follows

| **Time** | **Rate (*mole litre*$^{-1}$ *sec*$^{-1}$)** |
|---|---|
| 0 | $2.8\times10^{-2}$ |
| 10 | $2.78\times10^{-2}$ |
| 20 | $2.81\times10^{-2}$ |
| 30 | $2.79\times10^{-2}$ |

The reaction is

(A) Zero order (B) First order

(C) Second order (D) Third order

**29.** For a chemical reaction $A \rightarrow B$ it is found that the rate of reaction doubles, when the concentration of A is increased four times. The order in A for this reaction is

(A) Two (B) One

(C) Half (D) Zero

**30.** The following data are for the decomposition of ammonium nitrate in aqueous solution

| **Volume of $N_2$ in cc** | **Time (minutes)** |
|---|---|
| 6.25 | 10 |
| 9.50 | 15 |
| 11.42 | 20 |
| 13.65 | 25 |
| 35.05 | Finally |

The order of the reaction is

(A) Zero (B) One

(C) Two (D) Three

**31.** The hydrolysis of ethyl acetate is a reaction of

$$CH_3COOEt + H_2O \xrightarrow{H^+} CH_3COOH + EtOH$$

(A) First order (B) Second order

(C) Third order (D) Zero order

**32.** The rate of reaction between $A$ and $B$ increases by a factor of 100, when the concentration of $A$ is increased 10 folds. The order of reaction with respect to $A$ is

(A) 10 (B) 1

(C) 4 (D) 2

**33.** Which of the following is a first order reaction

(A) $NH_4NO_2 \rightarrow N_2 + 2H_2O$

(B) $2HI \rightarrow H_2 + I_2$

(C) $2NO_2 \rightarrow 2NO + O_2$

(D) $2NO + O_2 \rightarrow 2NO_2$

**34.** The inversion of cane sugar is represented by

$$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$

It is a reaction of

(A) Second order (B) Unimolecular

(C) Pseudo unimolecular (D) None of the three

**35.** Which one of the following formula represents a first order reaction

(A) $K = \frac{x}{t}$ (B) $K = \frac{1}{2t}\left[\frac{1}{(a-x)^2} - \frac{1}{a^2}\right]$

(C) $K = \frac{2.303}{t}\log_{10}\frac{a}{(a-x)}$ (D) $K = \frac{1}{t}\frac{x}{a(a-x)}$

**36.** If the half-life period of a reaction is inversely proportional to the initial concentration, the order of the reaction is

(A) Zero (B) One
(C) Two (D) Three

**37.** Which one of the following statements is wrong

(A) Molecularity of a reaction is always a whole number
(B) Order and molecularity of a reaction need not be same
(C) Order of a reaction may be zero
(D) Order of a reaction depends upon the mechanism of the reaction

**38.** The velocity constant of first order reaction is expressed in the units

(A) Concentration per unit time
(B) Time per unit concentration
(C) Per unit time
(D) Unit time per unit concentration

**39.** For reation, $A+B\rightarrow$ products, it is found that the rate of the reaction is proportional to the concentration of *A*, but it is independent of the concentration of B, then

(A) The order of the reaction 2 and molecularity 1
(B) Molecularity of the reaction is 2 but order is 1
(C) Order is 2 and molecularity is 2
(D) Order of the reaction is 2 but molecularity is 0

**40.** For a zero order reaction

(A) The concentration of the reactant does not change during the reaction
(B) The concentration change only when the temperature changes
(C) The rate remains constant throughout
(D) The rate of the reaction is proportional to the concentration

**41.** If '*a*' is the initial concentration and '*n*' is the order of the reaction and the half-life period is '*T*', then

(A) $T \propto a^{n-1}$ (B) $T \propto a^{n}$
(C) $T \propto \frac{1}{a^{n}}$ (D) $T \propto \frac{1}{a^{n-1}}$

**42.** In presence of $HCl$, sucrose gets hydrolysed into glucose and fructose. The concentration of sucrose was found to reduce form 0.4 $M$ to 0.2 $M$ in 1 hour and 0.1 $M$ in 2 hours. The order of the reaction is

(A) Zero (B) One
(C) Two (D) None of these

**43.** The time of half change of a first order reaction in ....... initial concentration

(A) Proportional to
(B) Inversely proportional to
(C) Independent of
(D) Equal to

**44.** Half-life period of a first order reaction is 138.6 minutes. The velocity constant of the reaction is

(A) $0.05\,\text{min}^{-1}$ (B) $0.00005\,\text{min}^{-1}$
(C) $0.005\,\text{min}^{-1}$ (D) $200\,\text{min}^{-1}$

**45.** An example of a pseudo –unimolecular reaction is

(A) Dissociation of hydrogen iodide
(B) Hydrolysis of methyl acetate in dilute solution
(C) Dissociation of phosphorus pentachloride
(D) Decomposition of hydrogen peroxide

**46.** Molecularity of reaction of inversion of sugar is

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

**47.** For any reaction, if we plot a graph between time '*t*' and $\log(a-x)$, a simple line is obtained. The order of reaction is

(A) Zero (B) One
(C) Two (D) Three

**48.** Value of velocity constant for first order reaction is $3.46\times10^{-3}\,\text{min}^{-1}$, the time for half change is

(A) 100 minutes (B) 400 minutes
(C) 200 minutes (D) 346 minutes

**49.** The unit of the velocity constant in case of zero order reaction is

(A) $Conc.\times time^{-1}$ (B) $Conc.^{-1}\times time$
(C) $Conc.^{-1}\times time^{-1}$ (D) $Conc.\times(time)^{2}$

**50.** For the reaction $H_2(g)+Br_2(g)\rightarrow 2HBr(g)$, the experimental data suggest, rate $=K[H_2][Br_2]^{1/2}$. The molecularity and order of the reaction are respectively

(A) $2,\frac{3}{2}$
(B) $\frac{3}{2},\frac{3}{2}$
(C) 1, 1
(D) $1,\frac{1}{2}$

**51.** The incorrect order indicated against the rate of reaction $A+B\xrightarrow{K}C$ is

| **Rate** | **Order** |
|---|---|
| (A) $\frac{d[C]}{dt}=K[A]$ | 1 |
| (B) $\frac{d[C]}{dt}=K[A][B]$ | 2 |
| (C) $\frac{-d[A]}{dt}=K[A][B]^0$ | 2 |
| (D) $\frac{-d[A]}{dt}K[A]$ | 1 |

**52.** Which of the following statements regarding the molecularity of a reaction is wrong

(A) It is the number of molecules of the reactants taking part in a single step chemical reaction
(B) It is calculated from the reaction mechanism
(C) It may be either a whole number or fractional
(D) It depends on the rate determining step in the reaction

**53.** Diazonium salt decomposes as

$$C_6H_5N_2^+Cl^-\rightarrow C_6H_5Cl+N_2$$

At $0^oC$, the evolution of $N_2$ becomes two times faster when the initial concentration of the salt is doubled. Therefore, it is

(A) A first order reaction
(B) A second order reaction
(C) Independent of the initial concentration of the salt
(D) A zero order reaction

**54.** In the reaction $A+B\rightarrow$ Products, if $B$ is taken in excess, then it is an example of

(A) Second order reaction
(B) Zero order reaction
(C) Pseudounimolecular reaction
(D) First order reaction

**55.** The half life of a first order reaction is $69.35\sec$. The value of the rate constant of the reaction is

(A) $1.0s^{-1}$
(B) $0.1s^{-1}$
(C) $0.01s^{-1}$
(D) $0.001s^{-1}$

**56.** Order of a reaction can have

(A) $+ve$ values
(B) Whole number values
(C) Fractional values
(D) All of the above

**57.** The order of the reaction occurring by following mechanism should be

(i) $A_2\rightarrow A+A$ (fast)
(ii) $A+B_2\rightarrow AB+B$ (slow)
(iii) $A+B\rightarrow$ (fast)

(A) $1\frac{1}{2}$
(B) $3\frac{1}{2}$
(C) 2
(D) None of these

**58.** For the reaction $A\rightarrow B$, the rate law expression is : Rate $=k[A]$

Which of the following statements is incorrect

(A) The reaction is said to follow first order kinetics
(B) The half life of the reaction will depend on the initial concentration of the reactant
(C) $k$ is constant for the reaction at a constant temperature
(D) The rate law provides a simple way of predicting the concentration of reactants and products at any time after the start of the reaction

**59.** If initial concentration is reduced to its 1/4th in a zero order reaction, the time taken for half of the reaction to complete

(A) Remains same
(B) Becomes 4 times
(C) Becomes one-fourth
(D) Doubles

**60.** For a reaction whose rate expression is :
Rate $= k[A]^{1/2}[B]^{3/2}$, the order would be
(A) 1.5 (B) 2
(C) 3 (D) 1

**61.** For the reaction $A \to B$, the rate increases by a factor of 2.25 when the concentration of $A$ is increased by 1.5. What is the order of the reaction
(A) 3 (B) 0
(C) 2 (D) 1

**62.** For the reaction $H_2 + Cl_2 \xrightarrow{\text{Sunlight}} 2HCl$ taking place on water, the order of reaction is
(A) 1 (B) 2
(C) 3 (D) 0

**63.** For a first order reaction, rate constant is $0.6932\,hr^{-1}$, then half-life for the reaction is
(A) $0.01\,hr$ (B) $1\,hr$
(C) $2\,hr$ (D) $10\,hr$

**64.** The rate constant of a reaction is $0.69 \times 10^{-1}\,\text{min}^{-1}$ and the initial concentration is $0.2\,mol\,l^{-1}$. The half-life period is
(A) 400 *sec* (B) 600 *sec*
(C) 800 *sec* (D) 1200 *sec*

**65.** The rate constant of a first order reaction is $3 \times 10^{-6}$ per second. If the initial concentration is 0.10 *m*, the initial rate of reaction is
(A) $3 \times 10^{-5} ms^{-1}$ (B) $3 \times 10^{-6} ms^{-1}$
(C) $3 \times 10^{-8} ms^{-1}$ (D) $3 \times 10^{-7} ms^{-1}$

**66.** Units of rate constant of first and zero order reactions in terms of molarity $M$ unit are respectively
(A) $sec^{-1},\ M\,sec^{-1}$ (B) $sec^{-1},\ M$
(C) $M\,sec^{-1},\ sec^{-1}$ (D) $M, sec^{-1}$

**67.** The reaction $2N_2O_5 \rightleftharpoons 2N_2O_4 + O_2$ is
(A) Bimolecular and second order
(B) Unimolecular and first order
(C) Bimolecular and first order
(D) Bimolecular and zero order

**68.** The half-life period for a first order reaction is 693 seconds. The rate constants for this reaction would be
(A) $0.1 sec^{-1}$ (B) $0.01 sec^{-1}$
(C) $0.001 sec^{-1}$ (D) $0.0001 sec^{-1}$

**69.** For an elementary reaction, $2A + B \to C + D$ the molecularity is
(A) Zero (B) One
(C) Two (D) Three

**70.** If the order of the reaction $x + y \xrightarrow{hv} xy$ is zero, it means that the rate of
(A) Reaction is independent of temperature
(B) Formation of activated complex is zero
(C) Reaction is independent of the concentration of reacting species
(D) Decomposition of activated complex is zero

**71.** For a first order reaction velocity constant, $K = 10^{-3} s^{-1}$. Two third life for it would be
(A) 1100 *s* (B) 2200 *s*
(C) 3300 *s* (D) 4400 *s*

**72.** In a reaction, the concentration of reactant is increased two times and three times then the increases in rate of reaction were four times and nine times respectively, order of reaction is
(A) Zero (B) 1
(C) 2 (D) 3

**73.** For a chemical reaction....can never be a fraction
(A) Order (B) Half-life
(C) Molecularity (D) Rate constant

**74.** 75% of a first order reaction was completed in 32 minutes when was 50% of the reaction completed
(A) 16 *min.* (B) 24 *min.*
(C) 8 *min.* (D) 4 *min.*

**75.** The decomposition of $N_2O_5$ occurs as, $2N_2O_5 \to 4NO_2 + O_2$, and follows I$^{st}$ order kinetics, hence
(A) The reaction is unimolecular
(B) The reaction is bimolecular
(C) $T_{1/2} \propto a^0$
(D) None of these

**76.** For a reaction, $X(g) \rightarrow Y(g) + Z(g)$ the half life period is 10 min. In What period of time would the concentration of $X$ be reduced to 10% of original concentration

(A) 20 *min* (B) 33 *min*

(C) 15 *min* (D) 25 *min*

**77.** A first order reaction with respect to the reactant $A$ has a rate constant of $6 \sec^{-1}$. If we start with $[A]$ = 0.5 mol/litre, then in what time the concentration of $A$ becomes 0.05 mol/litre

(A) 0.384 *sec* (B) 0.214 *sec*

(C) 3.84 *sec* (D) 0.402 *sec*

**78.** Order of radioactive disintegration reaction is

(A) Zero (B) First

(C) Second (D) Third

**79.** The rate of a first order reaction is $1.5 \times 10^{-2}\ molL^{-1}\ \min^{-1}$ at 0.5 $M$ concentration of the reactant. The half-life of the reaction is

(A) 8.73 *min* (B) 7.53 *min*

(C) 0.383 *min* (D) 23.1 *min*

**80.** A first order reaction was started with a decimolar solution of the reactant, 8 minutes and 20 seconds later its concentration was found to be $M/100$. So the rate of the reaction is

(A) $2.303 \times 10^{-5} \sec^{-1}$ (B) $2.303 \times 10^{-4} \sec^{-1}$

(C) $4.606 \times 10^{-3} \sec^{-1}$ (D) $2.606 \times 10^{-5} \sec^{-1}$

**81.** For reaction a $A \rightarrow x\ P$, when $[A] = 2.2\ mM$, the rate was found to be $2.4\ mM\ s^{-1}$. On reducing concentration of $A$ to half, the rate changes to $0.6\ mM\ s^{-1}$. The order of reaction with respect to $A$ is

(A) 1.5 (B) 2.0

(C) 2.5 (D) 3.0

**82.** Which one of the following statement for order of reaction is not correct

(A) Order can be determined experimentally.

(B) Order of reaction is equal to sum of the powers of concentration terms in differential rate law.

(C) It is not affected with the stoichiometric coefficient of the reactants.

(D) Order cannot be fractional.

**83.** $t_{\frac{1}{4}}$ can be taken as the time taken for the concentration of a reactant to drop to $\frac{3}{4}$ of its initial value. If the rate constant for a first order reaction is $K$, the $t_{\frac{1}{4}}$ can be written as

(A) $0.10/K$ (B) $0.29/K$

(C) $0.69/K$ (D) $0.75/K$

**84.** For a first order reaction $A \rightarrow B$ the reaction rate at reactant concentration of $0.01M$ is found to be $2.0 \times 10^{-5} mol\ L^{-1} s^{1}$. The half-life period of the reaction is

(A) 220 *s* (B) 30 *s*

(C) 300 *s* (D) 347 *s*

**85.** The rate of reaction between two reactants $A$ and $B$ decreases by a factor of 4 if the concentration of reactant B is doubled. The order of this reaction with respect to reactant $B$ is

(A) – 1 (B) – 2

(C) 1 (D) 2

## Collision theory, Energy of activation and Arrhenius equation

**86.** Which one of the following does not represent Arrhenius equation

(A) $k = Ae^{-E/RT}$

(B) $\log_e k = \log_e A - \frac{E}{RT}$

(C) $\log_{10} k = \log_{10} A - \frac{E}{2.303RT}$

(D) $k = AE^{-RT}$

**87.** On increasing the temperature, the rate of the reaction increases because of

(A) Decrease in the number of collisions
(B) Decrease in the energy of activation
(C) Decrease in the number of activated molecules
(D) Increase in the number of effective collisions

**88.** Energy of activation of a reactant is reduced by

(A) Increased temperature
(B) Reduced temperature
(C) Reduced pressure
(D) Increased pressure

**89.** The minimum energy a molecule should possess in order to enter into a fruitful collision is known as

(A) Reaction energy
(B) Collision energy
(C) Activation energy
(D) Threshold energy

**90.** Activation energy is

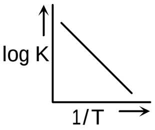
(A) The amount of energy to be added to the actual energy of a molecule so that the threshold energy is reached
(B) The amount of energy the molecule must contain so that it reacts
(C) The energy which a molecule should have in order to enter into an effective collision
(D) The average kinetic energy of the molecule

**91.** An endothermic reaction $A \rightarrow B$ has an activation energy $15\, kcal / mole$ and energy of reaction $5\, kcal / mole$. The activation energy of the reaction $B \rightarrow A$ is

(A) 20 *kcal/mole*
(B) 15 *kcal/mole*
(C) 10 *kcal/mole*
(D) None of these

**92.** Which of the following plots is in accordance with the Arrhenius equation

(A)



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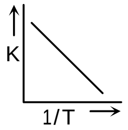

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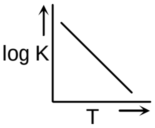
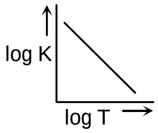


(D)



**93.** The Arrhenius equation expressing the effect of temperature on the rate constant of a reaction is

(A) $k = e^{-E_a/RT}$
(B) $k = E_a / RT$
(C) $k = \log_e \dfrac{E_a}{RT}$
(D) $k = Ae^{-E_a/RT}$

**94.** For a reaction, activation energy $(E_a) = 0$ and rate constant $(K) = 3.2 \times 10^6 s^{-1}$ at 300 $K$. What is the value of the rate constant at 310 $K$

(A) $3.2 \times 10^{-12} s^{-1}$
(B) $3.2 \times 10^{6} s^{-1}$
(C) $6.4 \times 10^{12} s^{-1}$
(D) $6.4 \times 10^{6} s^{-1}$

**95.** Activation energy is given by the formula

(A) $\log \dfrac{K_2}{K_1} = \dfrac{E_a}{2.303R}\left[\dfrac{T_2 - T_1}{T_1 T_2}\right]$

(B) $\log \dfrac{K_1}{K_2} = -\dfrac{E_a}{2.303R}\left[\dfrac{T_2 - T_1}{T_1 T_2}\right]$

(C) $\log \dfrac{K_1}{K_2} = -\dfrac{E_a}{2.303R}\left[\dfrac{T_1 - T_2}{T_1 T_2}\right]$

(D) None of these

**96.** Temperature dependent equation can be written as

(A) $\ln k = \ln A - e^{E_a/RT}$
(B) $\ln k = \ln A + e^{E_a/RT}$
(C) $\ln k = \ln A - e^{RT/E_a}$
(D) All of these

## Photochemical reactions

**97.** The formation of starch in plants results from

(A) Photosynthesis
(B) Photolysis
(C) Flash photolysis
(D) None of the above

**98.** The photolysis of water gives the substance

(A) $OH^- + H^+$
(B) $H_2 + OH^-$
(C) $H_2 + O_2$
(D) $H_2O + H_2O_2$

**99.** The law of photochemical equivalence was given by

(A) Drapper
(B) Grauths
(C) Einstein
(D) Labbert

**100.** If *'I'* is the intensity of absorbed light and *C* is the concentration of *AB* for the photochemical process $AB + hv \rightarrow AB^*$, the rate of formation of *AB** is directly proportional to

(A) *C*
(B) *I*
(C) $I^2$
(D) *C.I*