Q.1 Under a given set of experimental conditions, with increase in the concentration of the reactants the rate of a chemical reaction-

[1] Decreases

[2] Increases

[3] Remains unaltered

[4] First decreases and then increases.

Q.2 The rate at which a substance reacts depends on its-

[1] Atomic weight   [2] Equivalent weight   [3] Molecular weight   [4] Active Mass

Q.3 In a reaction involving the synthesis of ammonia by Haber's process,

$N_2 + 3H_2 \rightleftharpoons 2NH_3$, the rate of reaction was measured as = 2.5×10^{-4} mol L^{-1} s^{-1}. The rate of change of conc. of H_2 will be

[1] 1.25×10^{-4} mol $L^{-1}S^{-1}$

[2] 2.50×10^{-4} mol $L^{-1}S^{-1}$

[3] 7.5×10^{-4} mol $L^{-1}S^{-1}$

[4] 5.0×10^{-4} mol $L^{-1}S^{-1}$

Q.4 In the formation of sulphur trioxide by contact process, $2SO_2 + O_2 \rightleftharpoons 2SO_3$, the rate of reaction was measured as $\dfrac{-d[O_2]}{dt}$ = 2.5×10^{-4} mol lit^{-1} sec^{-1}. the rate of reaction expressed in terms of SO_3 will be-

[1] -1.25×10^{-4} mol L^{-2} sec^{-1}

[2] 50×10^{-4} mol L^{-1} sec^{-1}

[3] -3.75×10^{-4} mol L^{-1} sec^{-1}

[4] 5.00×10^{-4} mol L^{-1} sec^{-1}

Q.5 The rate constant of a reaction is equal to rate of reaction-

[1] When concentrations of reactants do not change with time

[2] When concentrations of all reactants and products are equal

[3] At time, t = 0

[4] When concentrations of all reactants are unity

Q.6 Which of the following is an unimolecular reaction ?

[1] $2HI \rightarrow H_2 + I_2$ [2] $N_2O_5 \rightarrow N_2O_4 + \dfrac{1}{2}O_2$ [3] $H_2 + Cl_2 \rightarrow 2HCl$ [4] $PCl_3 + Cl_2 \rightarrow PCl_5$

Q.7 If the surface area of the reactant is increased then the order of reaction :

[1] Increases

[2] Decreases

[3] Remains unaffected

[4] Sometimes increases and sometimes decreases

Q.8 Which of the following is a first order reaction-

[1] $NH_4NO_2 \rightarrow N_2 + 2H_2O$

[2] $2HI = H_2 + I_2$

[3] $2NO_2 \rightarrow 2NO + O_2$

[4] $2NO + O_2 \rightarrow 2NO_2$

Q.9 The hydrolysis of ethyl acetate is a reaction of - $CH_3COOEt + H_2O \xrightarrow{H^+} CH_3COOH + EtOH$

[1] First order

[2] Third order

[3] Second order

[4] Zero order

Q.10 For a chemical reaction $2X + Y \rightarrow Z$, the rate of appearance of Z is 0.05 mol L^{-1} per min. The rate of disappearance of X will be :

[1] 0.05 mol L^{-1} per hour [2] 0.05 mol L^{-1} per min [3] 0.1 mol L^{-1} min^{-1} [4] 0.25 mol L^{-1} per min

Q.11 For the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$

the rate of change of concentration for hydrogen is $- 0.3 \times 10^{-4}$ Ms^{-1}. The rate of change of concentration of ammonia is :

[1] $- 0.2 \times 10^{-4}$

[2] 0.2×10^{-4}

[3] 0.1×10^{-4}

[4] 0.3×10^{-4}

Q.12 The unit of rate constant for a zero order reaction is-

[1] Litre sec^{-1}

[2] Lit $mole^{-1}$ sec^{-1}

[3] Mol lit^{-1} sec^{-1}

[4] Mol sec^{-1}

Q.13 A zero order reaction is one whose rate is independent of-

[1] The temperature of the reaction

[2] The concentration of the reactants

[3] Proasence of catalyst

[4] None of these

Q.14 A reaction is represented by-

$A \xrightarrow{K_1} B$ (slow) and $A + B \xrightarrow{K_2} C$ (fast) where K_1 and K_2 and the rate constants of the mechanistic steps. The rate of production of C will be given by-

[1] $K_1[A]$ [B]

[2] K_1 [A]

[3] $K_1 K_2$ [A]

[4] K_2 [A] [B]

Q.15 The rate law for the reaction : $2 C + D \rightarrow A + E$ is $-\dfrac{d[D]}{dt} = k[C]^2[D]$

If C is present in large excess, the order of the reaction will be-

[1] Zero

[2] First

[3] Second

[4] Third

Q.16 The rate of reaction between A and B increase by a factor of 100, when the concentration of A is increased 10 folds. The order of reaction with respect to A is-

[1] 10

[2] 1

[3] 4

[4] 2

Q.17 The half-life of a first order reaction $\left[K = \dfrac{2.303}{t} \log \left(\dfrac{a}{a-x} \right) \right]$ is-

[1] Directly proportional to 'a'   [2] Inversely proportional to 'a'

[3] Independent of 'a'   [4] Proportional to (a-x)

Q.18 Which of the following statement is not correct for the reaction- $4A + B \rightleftharpoons 2C + 2D$

[1] The rate of disappearance of B is one forth rate of disappearance of A

[2] The rate of appearance of C is one half the rate of disappearance of B

[3] The rate of formation of D is one half the rate of consumption of A

[4] The rates of formation of C and D are equal.

Q.19 The temperature coefficient of most of the reactions lies between-

[1] 1 and 3   [2] 2 and 3   [3] 2 and 4   [4] 1 and 4

Q.20 True statement is-

[1] Positive catalyst increases the rate of a reaction

[2] During the course of the reaction, specific reaction rate remains constant.

[3] Rate constant always increases with rise in temperature whether the reaction is endothermic or exothermic

[4] All are correct

Q.21 The effect of temperature on the rate constant of a reaction is given by-

[1] Arrehenius Equation   [2] Nernst Equation

[3] vant's Hoff Equation   [4] Gibb's Helmholtz Equation

Q.22 In a certain reaction 10% of the reactant decomposes in one hour, 20% in two hours, 30% in three hours and so on. Dimension of the velocity constant (rate constant) are-

[1] Hour $^{-1}$ [2] Mol litre^{-1}hour $^{-1}$ [3] Litre mol^{-1} sec^{-1} [4] Mol sec^{-1}

Q.23 In a reaction, the threshold energy is equal to-

[1] Activation energy   [2] Activation energy - normal energy of reactants

[3] Activation energy + normal energy of reactants   [4] Normal energy of reactants

Q.24 The decomposition of H_2O_2 can be followed by titration with $KMnO_4$ and is found to be a first order reaction. The rate constant is 4.5×10^{-2}. In an experiment, the initial titre value was 25 ml. The titre value will be 5 ml after a lapse of-

[1] $4.5 \times 10^{-2} \times 5$ minutes   [2] $\dfrac{\log_e 5}{4.5 \times 10^{-2}}$ minutes   [3] $\dfrac{\log_e 5/4}{4.5 \times 10^{-2}}$ [4] None of the above

Q.25 The half-life of decomposition of N_2O_5 is a first order reaction represented by-

$N_2O_5 \rightarrow N_2O_4 + 1/2O_2$
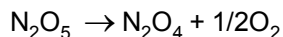
After 15 minutes the volume of O_2 produced is 9 ml and at the end of the reaction 35 ml. The rate constant is equal to-

[1] $\dfrac{1}{15}\log_e \dfrac{35}{26}$ 　　　[2] $\dfrac{1}{15}\log_e \dfrac{44}{26}$ 　　　[3] $\dfrac{1}{15}\log_e \dfrac{35}{36}$ 　　　[4] None of the foregoing

Q.26 The rate constant of a reaction is 1.5×10^{-3} at 25°C and 2.1×10^{-2} at 60°C. The activation energy is-

[1] $\dfrac{35}{333}R\log_e \dfrac{2.1\times 10^{-2}}{1.5\times 10^{-2}}$ 　　　　　　　　[2] $\dfrac{298\times 333}{35}R\log_e \dfrac{21}{1.5}$

[3] $\dfrac{298\times 333}{35}R\log_e 2.1$ 　　　　　　　　[4] $\dfrac{298\times 333}{35}R\log_e \dfrac{2.1}{1.5}$

Q.27 The rate constant (k) for the reaction $2X + Y \rightarrow$ Products, was found to be 3.58×10^{-4} L mole^{-1} s^{-1} after 15 seconds, 3.6×10^{-4} L mole^{-1} s^{-1} after 30 seconds and 3.56×10^{-4} L mole^{-1} s^{-1} after 50 seconds. Hence the order of the reaction is-

[1] Two 　　　　　[2] Three 　　　　　[3] Zero 　　　　　[4] One

Q.28 75% of a first order reaction was completed in 32 minutes. When was 50% of the reaction completed.

[1] 24 minutes 　　　　[2] 8 minutes 　　　　[3] 16 minutes 　　　　[4] 4 minutes

Q.29 If the concentration of the reactants in the reaction $2A + B \rightarrow C + D$ is increased by three folds, the rate of the reaction will be increased by-

[1] 27 times 　　　　[2] 9 times 　　　　[3] 64 times 　　　　[4] 01 times

Q.30 The *incorrect* statement is-

[1] All the collisions between reactant molecules do not lead to a chemical change

[2] A zero order reaction proceeds at a constant rate independent of concentration or time

[3] Fast reactions have low activation energies

[4] In a first order reaction, the reaction ideally takes finite time to be completed

Answer Key

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	2	4	3	4	4	2	3	1	1	3
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	2	2	2	4	3	2	2	4
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	1	2	3	2	1	4	1	3	1	4