CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA CHEMISTRY (GUJRATI ENGLISH)

CHEMICAL KINETICS

Section A Questions

1. For any chemical reaction chemists try to find out which things?

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2. What is chemcical kinetics?Which information is obtained by chemical kinetics for reaction and thermodynamics?

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3. Explain the rate of reaction with examples.

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4. What is rate of reaction?

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5. Explain average rate or reaction for hypothetical $R \rightarrow P$ reaction.

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6. Explain the rate of reaction depends on concentration and temperature.

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7. Explain :What is instantaneous rate ?How it is determine?

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8. Explain the relation between rate of reaction and stoichiometric coefficients of balance chemical equation with examples.

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9. Average rate of reaction decrease with concentration of reactant.Explain with example.

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10. What is rate law?Give a relation between rate of reaction and concentration of reactant?

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11. Write general reaction and its differential rate equaiton & rate law.

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12. By giving three examples explain that "the exponenets of the concentration terms are same or not as their stoichiometric coefficients in the balanced chemical reaction.

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13. Write general equation of reaction and explain -what is order of reaction?which is its value?

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14. Write about elementary and complex reactions.

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15. (a)Write general reaction and derive the units of rate constant. (b)Based on that write the rate constant for zero,first and 2^{nd} order reaction.

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16. What is molecularity of relation ?Explain its types by examples.

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17. Explain order of reaction of complex reaction by giving examples.

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18. For the following rate law determine the unit of rate constant.

Rate $k[A]^{\frac{1}{2}}[B]^{2} = [R]^{\frac{5}{2}}$

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19. What is zero order reaction ?Determine the intergrated rate equation for zero order reaction R $\rightarrow$ P.

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20. Give the graph of zero order reaction and which informtaion obtained from them?

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21. Give the example of zero order reaction.

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22. What is first order reaction?Determine the integrated rate equation for first order reaction R $\rightarrow$ P

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23. Give the graph for first order reaction and write the information obtained from it.

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24. Derive the equation showing the relation between the concentration $[R]_1$ and $[R]_2$ at time t_1 and t_2

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25. Give the examples of first order reactions.

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26. Following is a first order gas phase reaction:

$A_{(g)} \rightarrow B_{(g)} + C_{(g)}$ .At t time ,total pressure =p_t and partial pressure of A=p_A atm.So,derive the integrated rate equation for this reaction .

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27. What is Half-Life time of a reaction ?Derive the equation of Half -Life time $\left(t_{\frac{1}{2}}\right)$ for zero order reaction.

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28. Derive half life $t_{\frac{1}{2}}$ of first order reaction.

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29. Explain pseudo first order by giving exaple .

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30. Explain the effect of increase of temperature on rate of reaction and rate constant.

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31. What is Activation Energy (E_a)?Explain graph of reaction of activation energy and write about its probability.

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32. Explain the effect on reaction by Boltzman and Maxwell graph.

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33. The relation between mole fraction $\left(\frac{N_E}{N_T}\right)$ and temperature is explain by Boltzmann and Maxwell graph.

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34. Explain the rate of reaction with energy of activation and temperature with the help of Arrhenius equation state its importance .

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35. Explain:How the value of activation energy is dermine on the base of Aeehenius equation?

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36. What is catalyst?What is inhibitor?

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37. Explain:The catalyst increase the rate of reaction:

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38. Write characteristics of catalyst.

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39. Explain theory of chemical reaction.

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40. Explain that for any chemical reaction to occur proper orientation must be require

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Section A Problem

1. Calculate instantaneous rate $(r_{\in st})$ on the base of example problem-1 by graphically .Calculate 600 s,250 s,350s and 450s.

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Section A Try Yourself

1. In a reaction $R \rightarrow P$ concentration [M] obtained times (t) are shown in the following table.Calculate the average rate r_{av} of the reaction

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2. The following results are obtained in the hydrolysis of chlorobutane (C_4H_9Cl)

Find out average rate r_{av} of the reaction during different intervals of time.

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3. The velocity of disappearance for $HI 2.4 \times 10^{-2}$ mol $L^{-1}S^{-1}$ calculate the rate of formation of H_2

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4. $2A + B \rightarrow A_2B$ rate of reaction with respect to A is 3.9×10^{-9} so calculate the rate for using of B and formation of A_2B

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5. $5Br_{(aq)} + BrO_{aq}^{-} + 6H_{(aq)}^{+} \rightarrow 3Br_{2(aq)} + 3H_2O_l$

in this reaction $\frac{\Delta[br^-]}{\Delta t} = 4.2 \times 10^{-3} molL^{-1}S^{-1}$ so calculate $\frac{\Delta[Br_2]}{\Delta t}$ i.e. rate of foramtion of Br_2

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6. In question 5 rate of use of H^+ is x $molL^{-1}S^{-1}$ than (a) Rate of use of Br^{-1} (b)How much is the average rate of formation of Br_2?

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7. The three experimental data for determine the differential rate of reactiobn $2NO_{(g)} + Cl_{(g)} \rightarrow 2BOCl_{(g)}$ at definate temprerature are given below.

(a)Derive differential rate of reaction

(b)Calculate order of reaction

(iii)Calculate value of rate constant.

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8. The three experimental data for determine the differential rate of reaction $Cl_{2(g)} + 2NO_{(g)} \rightarrow 2NOCl_{(g)}$ at 310 K temperature .

(a) Derive differential rate of reaction

(b)Calculate order of reaction .

(c)Calculate value of rate constant.

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9. The initial concentration of $N_2O_5 \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$ was 1.24×10^{-2} mol L^{-1} at 300 K temperature .The concentration of N_2O_5 after 60 minutes was 0.2×10^{-2} mol L^{-1}.Calculate the rate constatn of the reaction .

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10. Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes .If the decomposition is a first order reaction.Calculate the rate constant of the reaction.

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11. Following is first order reaction:

N_2O_5 ("solution") $\rightarrow 2NO_2(\text{solution}) + \frac{1}{(2)_{O_2(g)}}$ In which $\mathbb{C}l_4$ is a solute .It is k=$5.0 \times 10^{-4} S^{-1}$

The concentration of N_2O_5 in initial is 0.25 mol L^{-1}

(i)What will be the rate of reaction initially?

(ii)Calculate half life $\left(\frac{t_1}{2}\right)$

(iii)How much time require to compute 75 % reaction ?

(iv)Calculate the concentration of N_2O_5 and NO after 30 min .

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12. In first order reaction concentration of reactant decrease from 0.80 mol L^{-1} to 0.06 mol L^{-1} in 45 min.Calculate half -life $\left(\frac{t_1}{2}\right)$

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13. For $Ra^{266t_{\frac{t}{2}}}$ yrs is 1620 yrs from 0.001 g of Ra how many α particles relaease per min?

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14. $2.25C^{14}$ atom is dissociate from 1 gm carbon of old statue. 15.3 C^{14} atom dissociate from carbon of living statue then how many years statue was old? C^{14}=5730 years.

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15. $t_{\frac{t}{2}}$ of Th^{232} is 1.39×10^{10} .Calculate α-particles omitted by 1 gm Th per sec.

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16. The first order reaction take time to complete 15% in 20 min .Then how much time is required to complete 75% reaction.

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17. The radio action substance decompose after 100 min and its concentration becomes part of 8 to original concentration.Calculate data constant and half life time.

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18. One ,odel is obtained from scu water 11.9 C^{14} atoms disssociate from 1 gm carbon 15.3 C^{14} atoms dissociate from live model then model was how many years old ?$t_{\frac{1}{2}}$=5730 years

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19. First order reaction complete 50% in 16 minutes .How much time require to complete 87.5%?

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20. The following results are obtained in one pseudo first order reaction:

(a)Calculate average rate of reaction between 30 to 60 seconds.

(b)Calculate the rate constant of this first order reaction

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21. Hydrolysis of methyl acetate in aq. Solution has been studied by titrating the liberated acetic acid against solidum hydroxide.The conc. Of the ester at different time is given below:

Show that it follows a pseudo first order reaction as the conc. of H_2O remain nearly constant $\left(54.2 mol L^{-1}\right)$ during the course of the reaction .What is the value of k in this reaction ?

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22. The reaction $CH_3COF + H_2O \Leftrightarrow CH_3COOH + HF$ was stidied under following conditions:

Determine the order of reaction and calculate rate constant.

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23. The rate constant of a reaction is $2 \times 10^{-3}\ \text{min}^{-1}$ at 300 K temperature .By increase in temperature by 20K,its value becomes three time,then calculate the energy of activation of the reactuon .what will be its rate constant at 310 K temperature?

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24. $CH_3CH_2CH_2I + OH \rightarrow CH_3CH_2CH_2OH + I^-$ at 27° C valu of velocity constant is 1.84 $\left(molL^{-1}\right)\ \text{min}^{-1}$ and if at 327 K temp. Value of velocity constant is 38.84 $\left(molL^{-1}\right)^1\ \text{min}^{-1}$ than find E_a

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25. The rate constant of a reaction is $2 \times 10^{-3}\ \text{min}^{-1}$ at 300 K temperature .By increase in temperature by 10 K its value becomes doubl. Calculate energy of activation .Calculation the rate constant at 320 K.

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26. In a first reaction at 27° C and $47^\circ C$ 50% reaction complete in 30 min.and 10 min.Calculate the energy of activation.

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Section A Questions

1. From the concentrations of C_4H_9Cl (butyl chloride) at different times given below given,calculate the average rate of the reaction : $C_4H_9Cl + H_2O \rightarrow C_4H_0OH + HCl$ during different intervals of time.

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2. The decomposition of N_2O_5 in $\mathbb{C}l_4$ at 318K has been studied by monitoring the concentration of N_2O_5 in the solution.Initially the concentration of N_2O_5 is 2.33 mol L^1 and after 184 minutes ,it is reduced of 2.08 mol L^{-1} .The reaction take place according to the equation $2N_2O_{5(g)} \rightarrow 4NO_{2(g)} + O_{2(g)}$ Calculate the average rate of this reaction in terms of hours,minutes and seconds.What is the rate of production of N_02 during this period?

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3. Calculate the overall order of a reaction which has the rate expression.

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4. Identify the reaction order from each of the following rate constant.

(i)K=$2.3 \times 10^{-5} Lmol^{-1}s^{-1}$

(ii)K=$3 \times 10^{-4} s^{-1}$

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5. The initial concentration of N_2O_5 in the following first order reaction

$N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$ was 1.24×10^{-2} Mol L^{-1} at 318 K.The concentration of N_2O_5 after 60 minutes was 0.20×10^{-2} mol L^{-1}. calculate the rate constant of the reaction at 318 K.

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6. The following data were obtained during the first order thermal decomposition of $N_2O_{5(g)}$ at constant volume:

$2N_2O_{5(g)} \rightarrow 2N_2O_{4(g)} + O_{2(g)}$

Calculate the rate constant.

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7. A first order reaction is found to have a rate constant ,k= $5.5 \times 10^{-14} s^{-1}$. Find the half-life of the reaction .

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8. Show that in a first order reaction,time required for completion of 99.9 % is 10 times of half-life $\left(t_{\frac{t}{2}}\right)$ of the reaction.

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9. Hydrolysis of methyl acetate in aqueous solution has been studied by titrating the liberated acetic acid against sodium hydroxide.The concentration of the ester at different times Is given below.

Show that it follows a pseudo first order reaction,as the concentration

of water remains nearly consttant (55 mol L^{-1}),during the course of the reaction.What is the value og k in this equation ?

Rate =k.$[CH_3COOCH_3][H_2O]$

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10. The rate constant of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively .Calculate the values of E_a and A.

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11. The first order rate constant for the decomposition of ethyl iodide by the reaction

$C_2H_5l_{(g)} \rightarrow C_2H_{4(g)} + HI_{(g)}$

at 600K is $1.60 \times 10^{-5} s^{-1}$. Its energy of activation is 209 KJ/mol. Calculate the rate constant of the reaction at 700 K.

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Section B Intext Questions And Answers

1. For the reaction R $\rightarrow$ P ,the concentration of a reactant changes from 003 M to 0.02 M in 25 minutes.Calculate the average rate of reaction using units of time both in minutes and seconds.

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2. In a reaction ,$2A \rightarrow$ products ,the concentration of A decreases from 0.5 mol L^{-1} to 0.4 mol L^{1} in 10 minutes.Calculate the rate during this interval.

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3. For the reaction $A + B \rightarrow$ product ,the rate law is given by , $r = k[A]^{\frac{1}{2}}[B]^{2}$.What is the order of the reaction ?

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4. The conversion of molecules X to Y follows second order kinetics.If concentration of X is increased to three times how will it affect the rate of formation of Y?

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5. A first order reaction has rate constant $1.15 \times 10^{-3} s^{-1}$ How long will 5 g of this reactant take to reduce to 3g?

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6. Time required to decompose SO_2Cl_2 to half of the initial amount is 60 minutes .If the decomposition is a first order reaction ,calculate the rate constant of the reaction,=.

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7. What will be the effect of temperature on rate constant?

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8. The rate of the chemical reaction doubles for an increase of 10 K in absolute temperature from 298 K.Calculate E_a.

(R=8.314 J $K^1 mol^{-1}$)

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9. The activation energy for the reaction $2HI_{(g)} \rightarrow H_{2(g)} + I_{2(g)}$ is 209.5 KJ mol^{-1} at 581 K.Calculate the fraction of molecules of reactants having energy equal to or freater than activation energy.

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Section C Textual Excercise

1. From the rate expression for the following reactions,determine their order of reaction and the dimensions of the rate constants.

(i)$3NO_{(g)} \rightarrow N_2O_{(g)} \qquad Rate = K[NO]^2$

(ii)

$H_2O_{2_{(aq)}} + 3I^-_{(aq)} + 2H^+_{(aq)} \rightarrow 2H_2O_{(l)} + l_3^- \qquad Rate = k[H_2O_2]\left[I^-\right]$

(iii)$CH_3CHO_{(g)} \rightarrow CH_{4(g)} + CO_{(g)}$

Rate=$K[CH_3CHO]^{\frac{3}{2}}$

(iv)$C_2H_5Cl_{(g)} \rightarrow C_2H_{4(g)} + HCl_{(g)}$

Rate =$k[C_2H_5Cl]$

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2. For the reaction :2A+B $\rightarrow A_2B$ the rate $= k[A][B]^2$ with k= $2.0 \times 10^{-6} mol^{-2} L^2 s^{-1}$ Calculate the initial rate of the reaction when [A]=0.1 mol L^{-1},[B] =0.2 mol L^{-1}.Calculate the rate of reaction after [A] is reduced to 0.06 mol L^{-1}

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3. The decomposition of NH_3 on platinum surface Is zero order reaction .What are the rates of production of N_2 and H_2 if $k = 2.5 \times 10^{-4} mol^{-1} Ls^{-1}$?

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4. The decomposition of dimethyl ether leads to the formation of CH_4, H_2 and CO and the reaction rate is given by

Rate $=k[CH_3OCH_3]^{\frac{3}{2}}$

The rate pressure is measured in bar and time in minutes ,then what are the units of rate and rate constants?

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5. Mention the factors that affect the rate of a chemical reaction.

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6. What is the effect of temperature on the rate constant of a reaction ?How can this effect of temperature on rate constant be represented quantitatively?

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7. In a pseudo first order hydrolysis of ester in water, the following results were obtained:

(i)Calculate the average rate if reaction between the time interval 30 to 60 seconds.

(ii)Calculate the pseudo first order rate constant for the hydrolysis of ester.

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8. A reacton is first order in A and second order in B.

(i)Wite the differential rate equation.

(ii)How is the rate affected on increasing the concentration of B three times?

(iii)How Is the rate affected when the concentration of both A and B are doubled?

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9. In a reaction between A and B ,the initial rate of reaction (r_0) was measured for different initial concentrations of A and B as given below:

What is the order of the reaction with respect to A and B?

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10. The followingh results have been obtained during the kinetic studeis of the reaction:

$2A + B \rightarrow C + D$

Determine the rate law and the rate constant for the reaction.

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11. The reaction between A and B is first order with respect to A and zero order with respect to B.Fill in the blanks in the following table:

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12. Calculate the half-life of a first order reaction from their rate constants given below:

(i)200 s^{-1} (ii) 2 $\min^{-1}$ (iii) 4 years^{-1}

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13. The half-Life for radioactive decay of ^{14}C is 5739 years.An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree.Estimate the age of the sample.

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14. The experimental data for decomposition of $N_2O_5[2N_2O_5 \rightarrow 4NO_2 + O_2]$ in gas phase at 318 K are given below:

(i)Plot $[N_2O_5]$againt t.(ii)Find the half-life period for the reaction

(iii)Draw a graph between $\log[N_2O_5]$ and t. (iv)What is the rate law?

(v) Calculate the rate constant.

(vi)Calculate the half-life periof from k and compare it with (ii)

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15. The rate constant for a first order reaction is 60 s^{-1} .How much time will it take to reduce the initial concentration of the reactant to its $\frac{1}{(16)^{th}}$ value?

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16. During nuclear explosion one of the products is ^{90}Sr with half-life of 28.1 years .If 1 μg of ^{90}Sr was absorbed in the boned of a newly born baby instead of calcium ,how much of it wil reman after 10 years and 60 years if it is not lost metabolically.

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17. For a order reaction,show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

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18. A first order reaction takes 40 min for 30% decomposition .Calculation $t_{\frac{1}{2}}$

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19. For the decomposition of azoisopropane to hexane and nitrogen at 543 K,the following dara are obtained.

Calculate the rate constant.

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20. The following data were obtained during the first order themal decomposition of SO_2Cl_2 at a constant volume . $SO_2Cl_{(g)} \rightarrow SO_{2(g)} + Cl_{2(g)}$

Calculate the rate of the reacton when total pressure is 0.65 atm.

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21. The rate constant for the decompositionof N_2O_5 a various tempeatures is given below:

Draw a graph between in k and $\frac{l}{T}$ and calculate the values of A and E_a .Predict the rate constant at 30° and 50° C

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22. The rate constant for the decomposition of hydrocarbons is $2.418 \times 10^{-5} s^{-1}$ at 546 K.If the energy of activaton is 179.9 KJ/mol, what will be the value of pre-exponetial factor.

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23. Consider a certain reaction A $\rightarrow$ products with $k = 2.0 \times 10^{-2} s^{-1}$.Calculate the concentration of A remining after 100 s if the initial concentration of A is 1.0 mol L^{-1}

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24. Surcose decomposes in acid solution into glucose and fructose according to the first order rate law .with $t_{\frac{t}{2}} = 3.00$ hours.What fraction of sample of surcose remains after 8 hours?

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25. The decomposition of hydrocarbon follows the equation k= $\left(4.5 \times 10^{11} s^{-1}\right) e^{-28000K/T}$

Calculate E_a

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26. The rate constant for the first order decomposition of H_2O_2 is given by the following equation:

log k=$14.34 - 1.25 \times 10^4 K/T$

[Where unit of k is s^{-1}]

Calculate E_a for this reaction and at what temperature will its half-period be 256 minutes?

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27. The decomposition of A into product has value of k as $4.5 \times 10^3 s^{-1}$ at $10^\circ C$ and energy of activation 60 KJ mol^{-1} .at what temperature would k be $1.5 \times 10^4 s^{-1}$?

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28. The time required for 10% completion of a first order reaction at 298 K is equal to that required for its 25% completion at 308 K.If the

value of A is $4 \times 10^{10} S^{-1}$.Calculate k at 318 K and E_a

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29. The rate of a reaction qudruples when the temperature changes from 293 K to 313 K.Calculation the energy of activation of the reaction assuming that it does not change with temperature.

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Section D Ncert Exemplar Solution Multiple Choice Quetions

1. The role of a catalyst is to change.....

A. Gibbs energy of reaction

B. enthalpy of reaction

C. activation energy of reaction

D. equilibrium constant

Answer: C

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2. In the presence of a catalyst,the heat evolved or absorbed during the reaction.....

A. increase

B. decreases

C. remains unchanged

D. may increase or decrease

Answer: C

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3. Activation energy of a chemical reaction can be determined by .....

A. determining the rate constant at standard temperature

B. determining the rate constants at two tempertatures

C. determining probability of collision

D. using catalyst.

Answer: B

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4. Consider figure below and mark the correct option.

A. Activation energy of forward reaction is $E_1 + E_2$ and product is less stable than reactant .

B. Activation energy of forward reaction is $E_1 + E_2$ and product is more stable than reactant

C. Activation energy of both forward and backward reaction is $E_1 + E_2$ and reactant is more stable than product.

D. Activation energy of backwatd and backward reaction is E_1 and product is more stable than reactant.

Answer: A

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5. Consider a first order gas phase decomposition reaction given below:

$A_{(g)} \rightarrow B_{(g)} + C_{(g)}$

The initial pressure of the system before decomposition of A was p_i .After lapse of time .t. total pressure of the system increased by x units and became .p_(t)`.The rate constant k for the reaction is given as.....

A. $k = \frac{2.303}{t} \log \frac{p_i}{p_i - x}$

B. $k = \frac{2.303}{t} \log \frac{p_1}{2p_i - p_t}$

C. $k = \frac{2.303}{t} \log \frac{p_i}{2p_i + p_t}$

D. $k = \frac{2.303}{t} \log \frac{p_i}{p_i + x}$

Answer: B

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6. According to Arrhenius equation rate constant k is equal to $Ae^{-E_a/RT}$.Which of the following options represents the graph of In k va $\frac{1}{T}$?

A. 

B. 

C. 

D. 

Answer: A

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7. Consider the Arrhenius equation given below and mark the correct option.

$k = Ae^{-E_a/RT}$

A. Rate constant increases exponentially with increasing activation energy and decreasing temperature.

B. Rate constant decreases exponentially with increasing activation energy and decreasing temperature.

C. Rate constant increase exponentially with decreasing activation energy and decreasing temperature.

D. Rate constant increases exponentially with decreasing activation energy and increasing temperature.

Answer: D

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8. A graph of volume of hyfrogen released Vs time for the reaction between zinc and dil.HCl is given in figure below.On the basis of this mark the correct option .

A. Average rate upto 40 seconds is $\frac{V_3 - V_2}{40}$

B. Average rate upto 40 seconds is $\frac{V_3 - V_2}{30}$

C. Average rate upto 40 seconds is $\frac{V_3}{40}$

D. Average rate upto 40 seconds is $\frac{V_3 - V_1}{40 - 20}$

Answer: C

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9. Which of the following statements is not correct about order of a reaction?

A. The order of a reaction can be a fractional number

B. Order of a reaction is experimentally determined quantity

C. The order of a reaction is always eqaul to the sum of the stoichiometric coefficients of reactants in the balanced chemical eqaution for a reaction.

D. The order of a reaction is the sum of the powers of molar concentration of the reactants in the reate law expression

Answer: D

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10. Consider the graph given in Figure.Which of the following options does not shopw instantaneus rate of reaction at 40 s?

A. $\frac{V_5 - V_2}{50 - 30}$

B. $\frac{V_4 - V_2}{50 - 30}$

C. $\frac{V_3 - V_2}{40 - 30}$

D. $\frac{V_4 - V_1}{40 - 20}$

Answer: B

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11. Which of the following statements is correct?

A. The rate of a reaction decreases with passage of time as the concentration of reactants decreases

B. The rate of a reaction is same at any time during the reaction

C. The rate of a reaction is independent of temperature change

D. The rate of a reaction decreases with increase in concentration of reactant (s).

Answer: A

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12. Which of the following expressions is correct for rate of reaction given below?

$$5Br^-_{(aq)} + BrO^-_{3(aq)} + 6H^-_{(aq)} \rightarrow 3BR_{2(aq)} + 3H_2O_{(i)}$$

A. $\frac{\Delta[Br^0]}{\Delta t} = 5\frac{\Delta[H^+]}{\Delta t}$

B. $\frac{\Delta[Br^-]}{\Delta t} = \frac{6}{5}\frac{\Delta H^+}{\Delta t}$

C. $\frac{\Delta[Br^-]}{\Delta t} = \frac{5}{6}\frac{\Delta[H^+]}{\Delta t}$

D. $\frac{\Delta[Br^-]}{\Delta t} = 6\frac{\Delta[H^+]}{\Delta t}$

Answer: C

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13. Which of the following graphs represents exothemic reaction?

A. only(i)

B. only (ii)

C. only (ii)

D. (i) and (ii)

Answer: A

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14. Rae law for the reaction A+2B $\rightarrow$ C is found to be Rate =K[A][B] concentration of reactant .B. is doubled ,keeping the concentration of .A. constant ,the value of rate constant will be.....

A. the same

B. doubled

C. quadrupled

D. halved

Answer: B

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15. Which of the following statements is incorrect about the collision theory of chemical reaction?

A. It consider reacting molecules or atoms to be hard spheres and ignores their structural features.

B. Number of effective collisions determined the rate of reaction.

C. Collision of atoms or molecules possessing sufficient threshold energy results into the product formation

D. Molecules should collide with sufficient threshold energy and proper orientation for the collision to be effective.

Answer: C

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16. A first order reaction is 50% completed in $1.26 \times 10^{14} S$.How much time would it take for 100% completion?

A. $1.26 \times 10^{15} s$

B. $2.52 \times 10^{14} s$

C. $2.52 \times 10^{28} s$

D. infinite

Answer: D

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17. Compounds .A. and .B. react according to the following chemical equation.

$A_{(g)} + 2B_{(g)} \rightarrow 2C_{(g)}$

Concentration of either .A. or .B. were changed keeping the concentrations of one of the reactant constant and rates were measured as a function of initial concentration .Following results were obtained.Choode the correct option for the rate equations for this reaction.

A. Rate=$k[A]^2$[B]

B. Rate=k[A]$[B]^2$

C. Rate=k[A][B]

D. Rate=[K]$[A]^2[B]^0$

Answer: B

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18. Which of the following statement is not correct for the catalyst?

A. It catalyses the forward and backward reaction to the same extent.

B. It alters ΔG of the reaction

C. It is a substance that does not change the equilibrium constant of a reaction

D. It provides an alternate mechanism by reducing activation energy between reactant and products.

Answer: B

View Text Solution

19. The value of rate constant of a pseudo first order reaction.....

A. depends on the concentration of reactants present in samll amount

B. depends on the concentratin of reactants present in excess

C. is independent of the concentration of reactants

D. depends only on temperature.

Answer: A

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20. Consider the reaction $A \rightarrow B$ .The concentration of both the reactants and the products varies exponentially with time.Which of the following figures correctly describes the changes in concentration of reactant and products with time?

A. 

B. 

C. 

D. 

Answer: B

View Text Solution

Section D Multiple Choice Questions Nore Than One Options

1. Rate law cannot be determined from balanced chemical equation if.....

A. reverse reaction is involved

B. it is an elementary reaction

C. it is a sequence of elementary reactions

D. any of the reactants is in excess.

Answer: (A),(C),(D)

View Text Solution

2. Which of the following statements are applicable to a balanced chemical equation of an elementary reaction?

A. Order is same as molecularity

B. Order is less than the molecularity

C. Order is greater than the molecularity

D. Molecularity can never be zero

Answer: (A),(D)

View Text Solution

3. In any unimolecular reaction.....

A. only one reacting species is involved in the rate determining step

B. the order and the molecularity of slowest step are equal to one.

C. the molecularity of the reaction is one and order is zero.

D. Both molecularity of the reaction is one and order is zero.

Answer: (A),(B)

View Text Solution

4. For a complex reaction.....

A. order of overall reaction is same as molecularity of the slowest step.

B. Order of overall reaction is less than the molecularity of the slowest step

C. order of overall reaction is greater than molecularity of the slowest step.

D. molecularity of the slowest step is never zero or non integer.

Answer: (A),(D)

View Text Solution

5. At high pressure the following reaction is zero order.

$$2NH_{3(g)} \xrightarrow[\text{Platinum catalyst}]{1130K} N_{2(g)} + 3H_{2(g)}$$

Which of the following options are correct for this reaction?

A. Rate of reaction =Rate constant

B. Rate of the reaction depends on concentration of ammonia

C. Rate of decomposition of ammonia will remain constant until ammonia disappears completely

D. Further increase in pressure will change the rate of reaction

Answer: (A),(C),(D)

View Text Solution

6. During decomposition of an activate complex.....

A. energy Is always released

B. energy is always absorbed

C. energy does not change

D. reactants may be formed

Answer: (A),(D)

View Text Solution

7. According to Maxwell ,Boltzmann distribution of energy.....

A. the fraction of molecules with most probable kinetic energy decreases at higher tempreratures.

B. the fration of molecules with most probable kinetic energy increases at higher temperatures.

C. Most probable kinetic energy increases at higher temperatures

D. most probable kinetic energy decreases at higher temperatures

Answer: (A),(C)

View Text Solution

8. In the graph showing Maxwell,Boltzman distribution of energy.....

A. area under the curve must not change with increase in temperature

B. area under the curve increases with increase in temperature

C. area under the curve decreases with increases in temperature

D. with increase in temperature curve broadens and shifts to the right hand side.

Answer: (A),(D)

View Text Solution

9. Which of the following statements are in accordance with the Arrhenius equation?

A. Rate of a reaction increases with increase in temperature

B. Rate of reaction increases with decreases in activation energy

C. Rate constant decreases exponentially with increase in temperature

D. Rate of reaction decreases with decrease in activation energy.

Answer: (A),(B)

View Text Solution

10. Mark the incorrect statements.

A. Catalyst provides an alternative pathway to reaction mechanism

B. Catalyst raises the activation energy

C. catalyst lowers the activation energy

D. Catalyst alters entahlpy change of the reaction

Answer: (B),(D)

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11. Which of the following graphs is correct for a zero order reaction?

A. 

B. 

C. 

D. 

Answer: (A),(D)

View Text Solution

12. Which of the following graphs is correct for a first order reaction?

A. 

B. 

C. 

D. 

Answer: A::D

View Text Solution

Section D Short Answer Type Question

1. State a condition under which a bimolecular reaction is kinetically first order reaction.

View Text Solution

2. Write the rate equation for the reaction $2A + B \rightarrow C$ if the order of the reaction is zero.

View Text Solution

3. How can you determine the rate law of the following reaction?

$2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$

View Text Solution

4. For which type of reactions,order and molecularity have the same value?

View Text Solution

5. In a reaction if the concentration of reactant A is tripled,the rate of reaction becomes twenty seven times.What is the order of the

reaction?

View Text Solution

6. Derive an expression to calculate time required for completion of zero order reaction.

View Text Solution

7. For a reaction $A + B \rightarrow$ products ,the rate law is ---- Rate = $k[A][B]^{\frac{3}{2}}$.Can the reaction be an elementary reaction?Explain.

View Text Solution

8. For a certain reaction large fraction of molecules has energy more than the threshold energy,yet the rate of reaction is very slow.Why?

View Text Solution

9. For a zero order reaction will the molecularity be equal to zero? Explain .

View Text Solution

10. For a genral reaction $A \rightarrow B$ plot of concentration of A vs time is given in figure.Answer the following question on the basis of this graph.

(I)What is the order of the reaction ?

(ii)What is the slope of the reaction?

(iii)What are the unit of rate constant?

View Text Solution

11. The reaction between $H_{2(g)}$ and $O_{2(g)}$ is highly feasible yet allowing the gases to satnd at room temperature in the same vessel does not lead to the formation of water .Explain.

View Text Solution

12. Why does the rate of a reaction increase with rise in temperature?

View Text Solution

13. Oxygen is available in plenty in air yet fuels do not burn by themselves at room temprature.Explain.

View Text Solution

14. Why is the probability of reaction with molecularity higher than three very rare?

View Text Solution

15. Why does the rate of any reaction generally decreases during the course of the reaction?

View Text Solution

16. Thermdynamic feasibility of the reaction alone cannot decide the rate of the reaction.Explain with the help of one example.

View Text Solution

17. Why in the redox titration of $KMnO_4$ vs oxalic acid,we heat oxalic solution before starting the titration?

View Text Solution

18. Why can.t molecularity of any reaction be equal to zero?

View Text Solution

19. Why molecularity is applicable only for elementary reactions and order is applicable for elementary s well as complex reactions?

View Text Solution

20. Why can we not determine the order of a reaction by taking into consideration the balanced chemical equation ?

View Text Solution

Section D Matching The Columns

1. Match the graph given in column -I with the order of reaction given in column-II .More than one item in column - may link to the same item of column -II.

View Text Solution

2. Match the statements given in column-I and column -II

View Text Solution

3. Match the items of column -I and column -II

View Text Solution

4. Match the items of column -I and column -II

View Text Solution

Section D Assertion And Reason Type

1. Assertion [A]:Order of the reaction can be zero or fractional.

Reason [R]:We cannot determine order from balanced chemical equation.

A. Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

B. Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A]

C. Assertion [A] is correct but reason [R] is correct

D. Assertion [A] is incrorrect but reason [R] is correct.

Answer: B

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2. Assertion [A]:Order and molecularity are same.

Reason [R]:Order is determined experimentally and molecularity is the sum of the stoichiometric coefficient of rate determining elementary step.

A. Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

B. Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A]

C. Assertion [A] is correct but reason [R] is correct

D. Assertion [A] is incrorrect but reason [R] is correct.

Answer:

View Text Solution

3. Assertion [A]:The enthalpy of reaction remain constant in the presence of a catalyst.Reason [R]:A catalyst participating in the reaction ,forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.

A. Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

B. Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A]

C. Assertion [A] is correct but reason [R] is correct

D. Assertion [A] is incrorrect but reason [R] is correct.

Answer: A

View Text Solution

4. Assertion [A]:All collision of reactant molecules lead to product formation.

Reason [R]:Only those collisions in which molecules have correct orientation and sufficient kinetic energy lead to compound formation.

A. Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

B. Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A]

C. Assertion [A] is correct but reason [R] is correct

D. Assertion [A] is incrorrect but reason [R] is correct.

Answer:

View Text Solution

5. Assertion [A]:Rate constants determined from arrhenius equation are fairly accurate for simple as well as complex molecule.

Reason [R]:Reactant molecules undergo chemical change irrespective of their orientation during collision

A. Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

B. Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A]

C. Assertion [A] is correct but reason [R] is correct

D. Assertion [A] is incrorrect but reason [R] is correct.

Answer: C

View Text Solution

Section D Long Answer Type Questions

1. All energetically effective collision do not result in a chemical change.Explain with the help of an example.

View Text Solution

2. What happens to most probable kinetic energy and the energy of activation with increase in temperature?

View Text Solution

3. Describe how does the enthalpy of reaction remain unchanged when a catalyst is used in the reaction .

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4. Explain the difference between instantaneous rate of a reaction and average rate of a rate of a reaction.

View Text Solution

Section E Multiple Choice Questions Mcqs

1. What is the SI unit of reaction rate?

A. mol $\sec^{-1}$

B. mol $m^{-3} \sec^{-1}$

C. mol $m^{-3} s^{-1}$

D. mol `lit^(-1)

Answer: B

View Text Solution

2. Of which of the following factors ,the rate of reacton depends?

A. Molecular mass of reactant

B. Atomic mass of reactant

C. Equivalent weight of reactant

D. active mass of reactant

Answer: D

View Text Solution

3. Which of the following statements is incorrect for Arrhenius rate constant equation.

A. It give quantative idea about K and T.

B. As T increase K is increasing and A is decreasing

C. As E_a increases K is increasing

D. If E_a=0 then K=A

Answer: C

View Text Solution

4. What is indicated by negative sign before the term of reaction rate?

A. The kinetic energy of the reaction decreases with time.

B. The energy barrier of reaction decreases with time.

C. The energy of activation of reaction decreases with time.

D. The concentration of reactants decreases with time.

Answer: D

View Text Solution

5. Zero order reaction means.....

A. Reaction occuring at zero Kelvin temperature

B. The value of reactio rate is zero

C. The reaction in which the reactants do not take part in chemical reaction

D. Reaction rate and rate constant are equal

Answer: D

View Text Solution

6. According to molecular collision theory,the reaction is subjected to.....

A. Number of molecular collision of reactant

B. Number of collision between reactant and activated comolex

C. The collision rate between reactant and product molecules

D. Number of effective molecular collision of reactants

Answer: D

View Text Solution

7. What is rate of reaction order of the following reation ?

Rate $=K[X]^{\frac{4}{5}}[Y]^{\frac{1}{5}}$

A. 1

B. $\frac{6}{5}$

C. $\frac{5}{6}$

D. $\frac{4}{5}$

Answer: A

View Text Solution

8. $^{226}_{86}Ra \rightarrow ^{222}_{84}Rn + \frac{4}{2}$He Order of reaction is..

A. 0

B. 1^{st}

C. 2^{nd}

D. 3^{rd}

Answer: B

View Text Solution

9. For unknown reaction half mole of reactant of total 2 moles reactant is converted in to product time is taken 1 hour.Then calculate how many moles of reactant is present after 4 hours?

A. 0.225 mole

B. 0.425 mole

C. 0.125 mole

D. 0

Answer: C

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10. In any reaction rate of reactant is double when concentration of reactant is increase in 4 time.If concentration of reaction is increase in 9 times than calciulate rate of reactant.

A. 4.5 times

B. 3 times

C. 9 times

D. 81 times

Answer: B

View Text Solution

11. For one molecule reaction at higher pressure or higher concentration what is order of reactant?

A. 0

B. 1

C. $1\frac{1}{2}$

D. 2

Answer: B

View Text Solution

12. When in reaction concentration of reactant is 8 time increase then rate of reactant is doubled than what is order of reaction?

A. First

B. $\frac{1}{3}$

C. 0.5

D. 0

Answer: B

View Text Solution

13. To takes part in reaction minimum kinetic energy is required is called....

A. Internal energy

B. Kinetic energy

C. Activation energy

D. Critical energy

Answer: C

View Text Solution

14. In Which system ,zero order reaction almost occurs in?

A. Hetro system

B. Close system

C. Homo system

D. Open system

Answer: A

View Text Solution

15. The reaction is of 1^{st} order.At initial the concentration of reactant is 0.1 mol L^1 .Rate constant is $=3 \times 10^{-2} s^{-1}$.Then what is the rate of reaction at initial?

A. 3×10^{-3} mol $L^{-1} s^{-1}$

B. 2×10^{-3} mol $L^{-1} s^{-1}$

C. 1×10^{-3} mol$L^{-1}s^{-1}$

D. 0.1×10^{-3} mol $L^{-1}s^{-1}$

Answer: A

View Text Solution

16. Which factor is present in second order reaction?

A. Time and concentration

B. Time and concentration of power two

C. Only time

D. Ony concentration

Answer: B

View Text Solution

17. For gaseous substances having rate of reaction is k[A][BN].If volume of container become $\frac{1}{4}$ than rate becomes .....times of initial rate.

A. $\frac{4}{1}$

B. $\frac{1}{8}$

C. $\frac{1}{16}$

D. $\frac{16}{1}$

Answer: D

View Text Solution

18. Generally ,10° of temperature should be increase to double the rate of chemical reation.If the temperature increase by 40°,then how much will be the rate of reaction?

A. half

B. double

C. 8 times

D. 16 times

Answer: D

View Text Solution

19. How many time is required to complete reaction when initial concentration of reactant is $[R]_0$ zero order reaction?

A. $\frac{[R]_0}{K}$

B. $\frac{2[R]_0}{K}$

C. $\frac{[R]_0^2}{K}$

D. $\frac{1}{2}\frac{[R_0]}{K}$

Answer: A

View Text Solution

20. The ionization of H_2SO_4 is completed in 2 steps .

(i)$H_2SO_4 \rightarrow H^+ + HSO_4^{-1}$

$k_a(1) = 1.4 \times 10^{-2}$mol $L^{-1}s^{-1}$

(ii)$HSO_4^- = 3.5 \times 10^{-2}$ mol $L^{-1}S^{-1}$

Then which of the following equation given below is true for rate?

A. Rate=$K_a(1)[H_2SO_4]$

B. Rate =$K_a(2)\left[HSO_4^-\right]$

C. Rate =$K_a(1)[H_2SO_4]$

D. Rate=$K_a(2)\left[HSO_4^-\right]$

Answer: B

View Text Solution

21. Reaction :$2NO_2F \rightarrow 2NO_2 + F_2$ Rate : $K[NO_2F]$.

What is step of deciding rate?

A. $NO_2 + F_2 \rightarrow NO_2F + F$

B. $NO_2F \rightarrow NO_2 + F$

C. $NO_2F + NO_2F \rightarrow 2NO_2 + F_2$

D. $NO_2 + FNO_2 + F_2$

Answer: B

View Text Solution

22. How the average rate of chemical reaction is decribed?

A. By increasing the concentration of products

B. By decreasing the concentration of reactants.

C. Both (A) and (B)

D. By changing in the time of reactants and products

Answer: D

View Text Solution

23. Which option is incorrect for

$2NO_{(g)} + O_{2(g)} \rightarrow 2N)(2(g))$?

A. $\frac{-1}{2}\frac{-d[NO]}{dt}$

B. $\frac{-1}{2}\frac{-d[NO]}{dt}$

C. $\frac{-d[O_2]}{dt}$

D. $\frac{1}{2}\frac{d[NO_2]}{dt}$

Answer: B

View Text Solution

24. Which of the following option is correct for first order reaction?

A. Molecularity is zero

B. The order of reaction is zero

C. The order of reaction is one

D. None of the given

Answer: C

View Text Solution

25. When molecules of reactant came to each other?

A. Kinetic energy increases

B. Internal energy will be constant

C. Internal energy remain constant

D. Kinetic energy decreases.

Answer: D

View Text Solution

26. Use/application of catalyst.....

A. For Gibb.s energy reaction

B. For reaction enthalpy

C. For increase/decrease of activation energy of reaction

D. It is equilibrium constant

Answer: C

View Text Solution

27. If during a reacton ,in presence of enzyme.heat is evolved or adsorbed ,then what change we can obseve in it?

A. Increases

B. Decreases

C. Remains constant

D. Can.t judge

Answer: C

View Text Solution

28. How to determine activation energy of chemical reaction?

A. Through rate constant at standard tempperature

B. Through rate constant at two different temperature

C. Through probable collision theory

D. None of above

Answer: B

View Text Solution

29. If one first order reaction is completed by 50% in 1.26×10^{14} second then how much time will be taken by this reaction to complete

100%?

A. 1.26×10^{15} second

B. 2.52×10^{14} second

C. 2.52×10^{25}second

D. Infinite time

Answer: D

View Text Solution

30. Rate of reaction for reaction .B. is double at constant concentration of .A. then what will change in rate constant value?

A. Remain constant

B. Doubles

C. Four times

D. None of above

Answer: A

View Text Solution

Section E Assertio And Reason Type

1. [A]:Sometimes rate of reactio does not depend on concentration.

[R]:The order of reaction can be negative.

A. Assertion [A] and reason [R] both are correct and [R] gives correct explanation of [A]

B. Assertion [A] and reason [R] both are correct but [R] does not give correct explanation of [A]

C. Assertion [A] is wrong but Reason [R] is wrong

D. Assertion [A] is wrong but Reason [R] is correct

Answer: B

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2. [A]:The catalyst increases the rate of reaction.

[R]:The catalyst decreases the enthalpy change (ΔH)

A. Assertion [A] and reason [R] both are correct and [R] gives correct explanation of [A]

B. Assertion [A] and reason [R] both are correct but [R] does not give correct explanation of [A]

C. Assertion [A] is wrong but Reason [R] is wrong

D. Assertion [A] is wrong but Reason [R] is correct

Answer: C

View Text Solution

3. [A]:The Arrhenius equation k=$Ae^{-E_a/RT}$ gives the relation between rate constant and temperature.

[R]:The graph of log $k \rightarrow \frac{1}{T}$ is linear and with the help of this calculation of energy of activation can be possible.

A. Assertion [A] and reason [R] both are correct and [R] gives correct explanation of [A]

B. Assertion [A] and reason [R] both are correct but [R] does not give correct explanation of [A]

C. Assertion [A] is wrong but Reason [R] is wrong

D. Assertion [A] is wrong but Reason [R] is correct

Answer: A

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4. [A]:If the activation energy of reaction is zero then the rate of reaction does not depend on temperature.

[R]:If the activation energy is less then the rate of reactio is more.

A. Assertion [A] and reason [R] both are correct and [R] gives correct explanation of [A]

B. Assertion [A] and reason [R] both are correct but [R] does not give correct explanation of [A]

C. Assertion [A] is wrong but Reason [R] is wrong

D. Assertion [A] is wrong but Reason [R] is correct

Answer: B

View Text Solution

5. [A]:Temperature of reaction increases by $10^{\circ}C$ the collision frequency of molecule increase by 2% to 3%

[B]:By increases temperature 10°C the rate of reaction is 200% from 100%

A. Assertion [A] and reason [R] both are correct and [R] gives correct explanation of [A]

B. Assertion [A] and reason [R] both are correct but [R] does not give correct explanation of [A]

C. Assertion [A] is wrong but Reason [R] is wrong

D. Assertion [A] is wrong but Reason [R] is correct

Answer: B

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Section E Mcqs Asked In Competitve Exam

1. The rate of a chemical reaction.....

A. increases as the reaction proceeds.

B. decreases as the reaction proceeds

C. may increase or decrease during the reaction.

D. remains constant as the reaction proceeds.

Answer: B

View Text Solution

2. A large increase in the rate of a reaction for a rise in temerature is due to.....

A. the decrease in the number of collisions

B. the increase in the number of activated molecules

C. the shortening of the activation energy

D. the lowering of the activation energy

Answer: B

View Text Solution

3. The specific are constant of a first order reaction depends on the.....

A. concentration of the reactants

B. concentration of the products

C. time of reaction

D. temperature of reaction

Answer: D

View Text Solution

4. A zero order reaction is one whose rate is independent of....

A. temperature of the reactants

B. the concentration of the reactants

C. the concentration of the products

D. the material of the vessel in which the reaction is carried out.

Answer: B

View Text Solution

5. The dimension of rate constant of a second order reaction involves....

A. neither time not concentration

B. only time

C. time and concentration

D. time and square of concentration

Answer: C

View Text Solution

6. The rate at which a substance reacts depends on its.....

A. atomic weight

B. equivalent weight

C. molecular weight

D. active mass

Answer: D

View Text Solution

7. The rate of reaction that not involve gases is not dependent on.....

A. Pressure

B. Temperature

C. Concentration

D. Cayalyst

Answer: A

View Text Solution

8. The rate constant of a reaction depend on.

A. Temperature

B. Mass

C. Weight

D. time

Answer: A

View Text Solution

9. A reaction involving two different reactants...

A. can never be a second order reaction

B. can never be a unimolecular reaction

C. can never be a molecular reaction

D. can never be a first order reaction

Answer: B

View Text Solution

10. Inversion of sucrose is.....

A. Zero order reaction

B. 1^{st} order reaction

C. $2nd$ order reaction

D. 3^{rd} order reaction

Answer: B

View Text Solution

11. If the concentraton of the reactants is increased ,the rate of reaction

A. remains unaffected

B. increases

C. decreases

D. may increase or decrease

Answer: B

View Text Solution

12. 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.

Answer: B

View Text Solution

13. The reaction rate at a given temperature becomes slower,then .....

A. the free energy of activation is higher

B. the free energy of activation is lower

C. the entropy changes.

D. the initial concentration of the reactants remains constant.

Answer: A

View Text Solution

14. half life period of second order reaction is.....

A. proportional to the initial concentration of reactants

B. Independent of the initial concentration of reactants

C. inversely proportional to initial concentration of reactants

D. inversely proportional to square of initial concentration of reactants.

Answer: C

View Text Solution

15. The thermal decomposition of a compound is of first order.If a sample of the compound decomposes 50% in 120 minutes,in what time will it undergo 90% decomposition....

A. nearly 240 minutes

B. nearly 480 minutes

C. nearly 450 minutes

D. nearly 400 minutes

Answer: D

View Text Solution

16. 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.

Answer: D

View Text Solution

17. If initial concentration is reduced to its $1/4^{th}$ 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

Answer: C

View Text Solution

18. A first order reaction which is 30% complete in 30 minutes has a half-life period of.....

A. 24.2 minutes

B. 58.2 minutes

C. 102.2 minutes

D. 120.2 minutes

Answer: B

View Text Solution

19. Activation energy of a chemical reaction can be determined by.....

A. Changing concentration of reactants

B. Evaluating rate constants at standard temperature

C. Evaluating rate constants at two different temperatures

D. Evaluating velocities of reaction at two different temperatures

Answer: C

View Text Solution

20. 75 % of a first order reaction was completed in 32 minutes when was 50% of the reaction complete.....

A. 16 min

B. 24 min

C. 8 min

D. 4 min

Answer: A

View Text Solution

21. Certain bimolecular reaction which follow the first order kinetics are called...

A. first order reactions

B. unimolecular reactions

C. bimolecular reactions

D. pseudounimolecular reaction

Answer: D

View Text Solution

22. The rate of a reaction depends upon the

A. Volume

B. pressure

C. force

D. concentration of reactant

Answer: D

View Text Solution

23. 75 % of a first order reaction is completed in 30 minutes.What is the time require for 93.75% of the reaction (in minutes)...

A. 45

B. 120

C. 90

D. 60

Answer: D

View Text Solution

24. A first order reaction is half completed in 45 minutes.How long does it need 99.9% of the reaction to be completed.

A. 5 Hr

B. 7.5 Hr

C. 10 Hr.

D. 20 Hr

Answer: B

View Text Solution

25. The rate of chemical reaction depends upon

A. time

B. pressure

C. concentration

D. All of these

Answer: D

View Text Solution

26. Order of a reaction is decided by.....

A. pressure

B. temperature

C. molecularity

D. relative concentration of reactants.

Answer: D

View Text Solution

27. The minimum energy a molecule should posses in order to enter into a fruitful collision is known as....

A. reaction energy

B. collision energy

C. activation energy

D. threshold energy

Answer: D

View Text Solution

28. Half life of reaction is found to be inversely proportional to the cube of its initial concentration.The order of reaction is

A. 2

B. 5

C. 3

D. 4

Answer: D

View Text Solution

29. Collision theory is applicable to....

A. first order reactions

B. zero order reactions

C. bimolecular reaction

D. intra molecular reactons

Answer: C

View Text Solution

30. Which of the following statements is false in relation to enzyme...

A. pH affects their functioning

B. temperature affects their functioning

C. they always increase activation energy

D. their reactions are specific

Answer: C

View Text Solution

31. 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

Answer: D

View Text Solution

32. Which reaction characteristics are changing by the addition of a catalyst to a reaction at constant temperature.....

(i)Activation energy (ii)Equilbrium constant

(iii)Reaction entropy (iv)Reaction enthalpy

A. (i) only

B. (iii)Only

C. (i) and (ii) only

D. All of these

Answer: A

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33. In a reaction,the concentration of reactant is increased two times and three times then the increase in rate of reaction were four times and nine times respectively,order of reaction is

A. Zero

B. 1

C. 2

D. 3

Answer: C

View Text Solution

34. For a chemical reaction.....can never be a fraction

A. Order

B. Half-life

C. Molecularity

D. Rate constant increases exponentially with decreasing activation energy and increasing temperature.

Answer: C

View Text Solution

35. 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.

Answer: C

View Text Solution

36. In the first order ,the concentration of the reactant is reduced to 25% in one four.The half life period of the reaction is....

A. 2hr

B. 4hr

C. 1/2 hr

D. 1/4 hr

Answer: C

View Text Solution

37. Which of the these does not influence the rate of reaction..

A. nature of the reactants

B. concentration of the reactants

C. temperature of the reaction

D. molecularity of the reaction

Answer: D

View Text Solution

38. 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

Answer: D

View Text Solution

39. If a substance with half life 3 days is taken at other place in 12 days.What amount of substance is -left now.....

A. $1/4$

B. $1/8$

C. $1/16$

D. $1/32$

Answer: C

View Text Solution

40. Which of the following reactions end in finite time....

A. 0 order

B. 1^{st} order

C. 2^{nd} order

D. 3^{rd} order

Answer: C

View Text Solution

Section E Mcqs Asked In Jee Neet Aieee

1. 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 calculate 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

Answer: C

View Text Solution

2. For a first order reaction ,the half-life period is independent of.....

A. initial concentration

B. cuber root of initial concentration

C. first power of final concentration

D. square root of final concentration

Answer: D

View Text Solution

3. For the reaction $3A \rightarrow 2B$ .What will be the reaction rate with reference to B?

A. $-\frac{3}{2}\frac{d[A]}{dt}$

B. $-\frac{2}{3}\frac{d[A]}{dt}$

C. $-\frac{1}{3}\frac{d[A]}{dt}$

D. $\frac{2d[A]}{dt}$

Answer: B

View Text Solution

4. Which statement is correct with reference to Arrhenius equation K= $Ae^{-Ea/RT}$?

A. A is adsorbent coefficient

B. E_a is a activation energy

C. R is Rydberg constant

D. K is equilibrium constant

Answer: B

View Text Solution

5. If the activation of forward reaction In a simple chemical reaction A $\rightarrow$ B is E_a,then what will be activation energy for reverse reaction?

A. $-E_a$

B. Always less than E_a

C. Always twice of E_a

D. More or less than E_a

Answer: D

View Text Solution

6. What will be the order of reaction if the half life time of reaction is halved by making initial concentration of reactant doubled?

A. 0.5

B. 1

C. 2

D. 0

Answer: C

View Text Solution

7. The values of the rate constant of the reaction $C_2H_5I + OH^- \rightarrow C_2H_5OH + I^-$ at 30° and $60^\circ C$ temperatures are 0.325 and 6.735 litre mole^{-1} second^{-1} than what will be the value of activation energy?

A. 20260 cal

B. 20260 K cal

C. 361.44 cal

D. 84773 cal

Answer: A

View Text Solution

8. In a first order reaction ,the concentration of the reactant,decreases from 0.8 M to 0.4 M in 15 minutes .The time taken for the concentration to change from 0.1 M to 0.025 M is.....

A. 7.5 minutes

B. 15 minutes

C. 30 minutes

D. 60 minutes

Answer: C

View Text Solution

9. Order of radioactive disintegration reaction is.....

A. zero

B. first

C. second

D. third

Answer: B

View Text Solution

10. Which is correct about zero order reaction ....

A. rate of reaction depends on decay constant

B. rate of reaction is independent of concentration

C. unit of rate constant is $\text{concentration}^{-1}$

D. unit of rate constant is $\text{concentration}^{-1}\ \text{time}^{-1}$

Answer: B

View Text Solution

11. The half-life of 2 sample are 0.1 and 0.4 seconds.Their respective concentration are 200 and 50 respectively.What is the order of the reaction.

A. 0

B. 2

C. 1

D. 4

Answer: B

View Text Solution

12. 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

Answer: B

View Text Solution

13. The rate of a reaction doubles when its temperature changes from 300 K to 310 K.Activation energy of such a reaction will be:

(R=8.314 $JK^{-1}mol^{-1}$ and log 2=0.301)

A. 53.6 KJ mol^{-1}

B. 48.6 KJ mol^{-1}

C. 58.5 KJ mol^{-1}

D. 60.5 KJ mol^{-1}

Answer: A

View Text Solution

14. For the non-stoichiometre reaction 2A+B $\rightarrow$ C+D,the following kinetic data were obtained in three separatte experiments,all at 298 K.

The rate law for the formation of C is:

A. $\frac{dc}{dt} = K[A][B]^2$

B. $\frac{dc}{dt} = K[A]$

C. $\frac{dc}{dt}$=k[A][B]

D. $\frac{dc}{dt} = k[A]^2[B]$

Answer: B

View Text Solution

15. Considering the basic strength of amines in aqueous solution ,which one has the smallest pk_b value?

A. $(CH_3)_3N$

B. $C_6H_5NH_2$

C. $(CH_3)_2NH$

D. CH_3NH_2

Answer: C

View Text Solution

16. When intial concentration of a reactant is doubled in a reaction ,its half -life periof is not affected.The order of the reaction is:

A. zero

B. first

C. second

D. More than zero but less than first.

Answer:

View Text Solution

17. The rate constant of the reaction A $\rightarrow$ B is 0.6×10^{-3} mole per second.If the concentration of A is 5 M ,then concentration of B after 20 minutes is :

A. 0.36 M

B. 0.72 M

C. 1.08 M

D. 3.60 M

Answer: B

View Text Solution

18. Decomposition of H_2O_2 follows a first oeder reaction.In fifty minutes the concentration of H_2O_2 decreases from 0.5 to 0.125 M in one such decomposition .When the concentration of H_2O_2 reaches 0.05 M ,the rate of formation of O_2 will be:

A. 1.34×10^{-2} mol $\min^{1}$

B. 6.93×10^{-2} mol $\min^{-1}$

C. 6.93×10^{-4} mol $\min^{-1}$

D. 2.66 L $\min^{-1}$ at STP

Answer: C

View Text Solution

19. The ionic radii of A^{+} and B^{-} ions are 0.98×10^{-10}m and $1.81 \times 10^{-10}m$.The co-ordination number of each ion in AB is :

A. 4

B. 8

C. 2

D. 6

Answer: D

View Text Solution

20. Lithium has a bcc structure.Its density is 530 kg m^{-3} and its atomic mass is 6.94 g mol^{-1} calculate the edge length of a unit cell of Lithium metal.($N_A = 6.02 \times 10^{23} mol^{-1}$)

A. 352 pm

B. 527 pm

C. 264 pm

D. 154 pm

Answer: A

View Text Solution

21. The rate of a first-order reaction is 0.04 mol $l^{-1}s^{-1}$ at 10 seconds and 0.03 mol $l^{-1}s^{-1}$ at 20 seconds after initation of the reaction.The half life perriod of the reaction is .....

A. 34.1

B. 44.1 s

C. 54.1s

D. 24.1 s

Answer: D

View Text Solution

22. The decomposition of phosphine (pH_3) on tungsten at low pressure is a first-order reaction .It is because the .....

A. rate is independent of the surface coverage.

B. rate of decomposition is very slow.

C. rate is proportional to the surface coverage

D. rate is inversely proportional to the surface coverage

Answer: C

View Text Solution

23. In calcium fluoride,having the fluorite structure ,the coordination number for calcium ion Ca^{+2} and fluoride ion F^{-} are

A. 8,4

B. 4,8

C. 4,2

D. 6,6

Answer: A

View Text Solution

View Text Solution

24. Two reactions r_1 and R_2 have indentical prexponential factors.Activation energy of R_1 exceeds that of R_2 by 10 KJ mol^{-1} .If K_1 and k_2 are rate constants for reaction R_1 and R_2 respectively at 300 K,then ln (K_2/K_1) is equal to .....(R=8.314 J $mol^{-1}K^{-1}$)

A. 8

B. 12

C. 6

D. 4

Answer: D

View Text Solution

25. For the reaction ,XA+YB $\rightarrow$ ZC, if

$\frac{-d[A]}{dt} = \frac{-d[B]}{dt} = \frac{1.5d[C]}{dt}$, then the correct statement among the

following is.....

A. the value of X=Y=Z=3

B. the value of X=Y=3

C. the value of X=2

D. the value of Y=2

Answer: B

View Text Solution

26. Consider the reaction between chlorine and nitric oxide

$Cl_{2(g)} + 2NO_{(g)} \rightarrow 2NOCl_{(g)}$

n doubling the concentration of both reactants,the rate of the reaction increases by a factor of 8.However,if only the concentration of Cl_2 is doubled ,the rate increases by a factor of 2.The order of this reaction with respect to NO is....

A. 0

B. 1

C. 2

D. 3

Answer: C

View Text Solution

27. The correct difference between first and second order reaction is that.....

A. the rate of a first-order reaction does depend on reactant concentration ,the rate of a second-order reaction does not depend on reactant concentrations

B. the rate of a first-order reaction does not depend on reactant concentration ,the rate of a second-order reaction does depend

on reactant concentrations

C. a first-order reaction can be catalyzed,a second -order reacion cannot be catalyzed

D. the half-life of a first-order reaction does not depend on $[A]_0$ the half-life of a second-order reaction does depend on $[A]_0$

Answer: D

View Text Solution

28. When intial concentration of the reactant is doubled ,the half-life period of a zero order reation.....

A. remains uncharged

B. is halved

C. is tripled

D. is doubled

Answer: D

View Text Solution

29. At 518° C,the rate of decomposition of a sample of gaseous acetaldehyde,initially at a pressure of 363 torr,was 1.00 torr s^{-1} when 5% has reacted and 0.5 torr s^{-1} when 33% had reacted.The order of the reaction is :

A. 2

B. 3

C. 1

D. 0

Answer: A

View Text Solution

30. Initial chemical reaction $A_2 \underset{K_{-1}}{\overset{K_1}{\rightleftharpoons}} 2A$, then $\frac{d[A]}{dt}$.....

A. $k_1[A]_2 - k_{-1}[A]^2$

B. $2k_1[A_2] - k_{-1}[A]^2$

C. $2k_1[A]_2 - 2k_{-1}[A]^2$

D. $k_1[A_2] + k_{-1}[A]^2$

Answer: C

View Text Solution

31. From the following reaction of H_2 and X_2 ,in which reaction catalyst is necessary?

A. $H_2 + Br_2 \rightarrow 2HBr$

B. $H_2 + I_2 \rightarrow 2HI$

C. $H_2 + Cl_2 \rightarrow 2HCl$

D. $H_2 + F_2 \rightarrow 2HF$

Answer: B

View Text Solution

32. For the chemical reaction ,

$N_{2(g)} + 3H_{2(g)} \Leftrightarrow 2NH_{3(g)}$ What is the correct option?

A. $3\frac{d[H_2]}{dt} = 2\frac{d[NH_3]}{dt}$

B. $-\frac{1}{3}\frac{d[H_2]}{dt} = -\frac{1}{2}\frac{d[NH_3]}{dt}$

C. $-\frac{d[N_2]}{dt} = 2\frac{d[NH_3]}{dt}$

D. $-\frac{d[N_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$

Answer: D

View Text Solution

33. If the rate constant for a first order reactions K ,the time (t) required for the completion of 99% of the reaction is given by :

A. t=2.303 /k

B. t=0.693/k

C. t=6.909 /K

D. t=4.606/k

Answer: D

View Text Solution

34. During the nuclear explosion,one of the products ^{90}Sr was absorbed in the bones of a newly born baby in place of ca .How much time in years is required to reduce it by 90% if it is not lost metabolically? ($t_{\frac{1}{2}}$=6.93 years)

View Text Solution

Section E Mcqs Asked In Gujcet Board Exams

1. The half life period for a first order reaction is

A. proportional to concentration

B. independent of concentration

C. inversely proportional to concentration

D. inversely proportional to the square of the concentration

Answer: B

View Text Solution

2. According to Arrhenius equation,the slope of log $K \rightarrow \frac{1}{T}$ plot is.....

A. $\frac{-E_a}{2.303}$

B. $\frac{-E_a}{2.303R}$

C. $\frac{E_a}{2.303RT}$

D. $\frac{E_a}{2.303RT}$

Answer: B

View Text Solution

3. The value of rate constant for a first order reaction is $2.303 \times 10^{-2}\,\text{sec}^{-1}$.What will be the time required to reduce the concentration to $\frac{1}{10}th$ of its initial concentration?

A. 10 second

B. 100 second

C. 2303 second

D. 230.3 second

Answer: B

View Text Solution

4. Total order of reaction $X + Y \rightarrow XY$ is 3 .The order of reaction with respect to X is 2.State the differential rate equation for the reaction

A. $\frac{-d[X]}{dt} = K[x]^3[Y]^0$

B. $-\frac{d[X]}{dt} = K[X]^0[Y]^3$

C. $-\frac{d[X]}{dt} = K[X]^2[Y]$

D. $-\frac{d[X]}{dt} = K[X][Y]^2$

Answer: C

View Text Solution

5. $X \xrightarrow{\text{Step-1}} Y \xrightarrow{\text{Step-II}} Z$ is complex reaction total order of reaction is 2 and step -II is sloW step.What is molecularity of Step-II?

A. 1

B. 2

C. 3

D. 4

Answer: B

View Text Solution

6. Reaction $3ClO^- \rightarrow ClO_3^- + 2Cl^-$ occurs in following two steps.

(i)$ClO^- + ClO \xrightarrow{K_1} ClO_2^- + Cl^-$ (Slow step)

(ii)$ClO_2^- + ClO^- \xrightarrow{K_2} ClO_3^- + Cl^-$ (Fast step)

Then the rate of given reaction =.....

A. $K_1\left[Cl^-\right]^2$

B. $K_1\left[ClO^-\right]$

C. $K_2\left[ClO_2^1\right]\left[ClO^-\right]$

D. $K_2\left[ClO^-\right]^3$

Answer: A

View Text Solution

7. How much time is required for completion of a zero order reaction?

A. $\frac{2[R_o]}{K}$

B. $\frac{R_o}{2K}$

C. $\frac{[R_o]}{K}$

D. $\frac{K}{[R_0]}$

Answer: C

View Text Solution

8. Time taken for consumption of half of the initial concentration is 20 seconds for a first order reaction .What will be the time taken by the same reaction to get the concentration of reactant from 0.123 M to 0.0625 M.

A. 5 sec

B. 20 sec

C. 10 sec

D. 40 sec

Answer: B

View Text Solution

9. What is the unit for rate constant for pseudo first order reaction ?

A. L $mol^{-1}\,\sec^{-1}$

B. $\sec^{-1}$

C. mol $\mathrm{lt}^{-1} \sec^{-1}$

D. $L^2 mol^{-2} \sec^{-1}$

Answer: A

View Text Solution

10. At 298 K temperature the activation energy for the reaction $X_2 + Y_2 \rightarrow XY + 20KJ$ is 15 KJ.

What will be the activation energy for the reaction $2XY \rightarrow X_2 + Y_2$?

A. $+35KJ$

B. $-35KJ$

C. $-5KJ$

D. $-15KJ$

Answer: A

View Text Solution

11. The rate constant value for a reaction is $1.75 \times 10^2 L^2 mol^{-2} \sec^{-1}$ .The half life period $t_{\frac{1}{2}} \alpha$.....

A. $[R_o]^{-2}$

B. $[R_o]$

C. $[R_o]^2$

D. $[R_o]^{-1}$

Answer: A

View Text Solution

12. The half life period for a radioactive substance is 15 minutes.How many gms of this substance after one hour?

A. 25

B. 46.875

C. 43.75

D. 37.5

Answer: B

View Text Solution

13. The value of slope and intercept in the graph of Freundlich adsorption isotherm at 25° C temperature are 0.5 and 0.4771 respectively.What will be the propertion of adsorption at 4 bar pressure?

A. 6

B. 3

C. 24

D. 12

Answer: A

View Text Solution

14. At 27°C temperature time required for 75 % completion of a first order reaction 20 seconds.What will be its rate constatn?

A. 0.693 $s^{-1}mol^{-1}$ lt

B. 0.0693 s^{-1}

C. 0.693 s^{-1}

D. 0.0693 $s^{-1}mol^{-1}$ lt

Answer: B

View Text Solution

15. In a first order reaction the time reaquired for the concentration to decrease from 6 moles to 3 moles is 40 minutes in such a reaction what time will be taken for the conversion reactant from 12 moles to 6 moled?

A. 20 minutes

B. 40 minutes

C. 80 minutes

D. 160 minutes

Answer: B

View Text Solution

16. What is the correct formula for R $\rightarrow$ P reaction rate?

A. $\frac{\Delta[R]}{t} = \frac{-\Delta[P]}{t}$

B. $\frac{-\Delta[R]}{\Delta t} = \frac{\Delta[P]}{\Delta t}$

C. $\frac{-[R]}{t} = \frac{\Delta[P]}{\Delta t}$

D. $\frac{-\Delta[R]}{\Delta t} = \frac{\Delta t}{\Delta[P]}$

Answer: B

View Text Solution

17. Mention the unit of K for zero order reaction.

A. Mole $\text{litre}^{-1}\text{second}^{1}$

B. second^{-1}

C. $(\text{Mole}/\text{litre})^{-1}\text{second}^{-1}$

D. Mole $\text{litre}^{-1}\text{second}^{-1}$

Answer: A

View Text Solution

18. The unit of rate constant of second order reaction is.....

A. litre .mol^(-1), second^{-1}

B. $\text{mole}^{-1}\text{litre}\text{second}^{-1}$

C. mole/litre .second^{-1}

D. $(\text{Mole/litre})^{-1}\text{second}^{\wedge}(-1)$

Answer: B

View Text Solution

19. If graph log K $\rightarrow \frac{1}{T}$ is plotted ,a straight line is obtained then what will be value of slope ?

A. $\frac{E_a}{2.303R}$

B. $\frac{-E}{3.203R}$

C. $\frac{-2.303R}{E_a}$

D. $\frac{-E_a}{2.303R}$

Answer: D

View Text Solution

20. For one first order reaction 60 minutes are required to decrease the initial concentration from 0.8 M to 0.1 M,determine the half reaction time $\left(t_{\frac{1}{2}}\right)$

A. 20 min

B. 30 min

C. 40 min

D. 15 min

Answer: A

View Text Solution

21. AB $\rightarrow$ A+B is a zero order reaction,if K= $4 \times 10^{-1} \text{molelitre}^{-1} \text{second}^{-1}$,then how much will be the production rate in mole $\text{litre}^{-1} \text{second}^{-1}$ for A?

A. 2×10^{-1}

B. 4×10

C. 1.6×10^{-3}

D. 2×10^{-2}

Answer: B

View Text Solution

22. The half reaction time required to decrease initial cocentration from 40% to 20 % is 20 minute.What time will be taken to decrease initial concentration from 10% to 5%?

A. 20 minute

B. 5 minute

C. 10 minute

D. 60 minute

Answer: B

View Text Solution

23. What will be the theoretical rate of elementary reaction if pressure of O_2 is increased by three times?

$2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

A. 27 time increase

B. 9 times increase

C. 18 times increase

D. 3 time increase

Answer: D

View Text Solution

24. If energy of activation of a reaction is 2303 joule,then what Is the value of slope of graph log $k \to \frac{1}{T}$?

A. -12195.12 joule

B. -503.27 Joule

C. -120.28 joule

D. -239.0 joule

Answer: C

View Text Solution

25. What is the value of slope of graph of concentration of R versus time for zero order reaction?

A. $\frac{K}{2.303R}$

B. $-\frac{E_a}{2.303}$

C. $-K$

D. $-\frac{E_a}{2.303R}$

Answer: D

View Text Solution

26. For any chemical reaction ,value of slope of In K $\rightarrow \frac{1}{T}$ graph will be.....

A. $-\frac{E_a}{2.303}$

B. $-\frac{E_a}{R}$

C. $-\frac{E_a}{2.303R}$

D. $-E_a$

Answer: B

View Text Solution

27. In elementary reaction :$2SO_{2(g)} + O_{2(g)} \rightarrow$ product.If pressure of SO_2 gas is doubled and pressure of O_2 gas is hallved ,then what will be the increase in rate of reaction?

A. Sixteen times

B. Two times

C. Four times

D. Eight times

Answer: B

View Text Solution

28. Which of the following statement is not appropriate?

A. Activated complex is short lived molecule

B. Activated complex breaks due to its oscillation motion.

C. Activated complex possesses very weak bonds

D. Activated complex possesses minimum potential energy.

Answer: D

View Text Solution

29. For the first order reaction ,the time required for completion of 50% reaction is 100 seconds.The rate the constant will be.....

A. 6.93×10^{-3} mol ^{2} lit $^{-2}s^{-1}$

B. $5.93 \times 10^{-3}s^{-1}$

C. 6.93×10^{-3} mol $lit^{-1}s^{-1}$

D. $6.93 \times 10^{-2} s^{-1}$

Answer: B

View Text Solution

30. The negative value for slope of the graph of concentration of reactant [R] $\rightarrow$ t indicates.....

A. Zero order reaction

B. first order reaction

C. instantaneous rate

D. both zero order reaction and instantaneous rate.

Answer: A

View Text Solution

31. For which of the following reaction ,Oswald.s isolation method is useful for determination of order of the reaction?

A. $N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$

B. $H_2O_{2(l)} \rightarrow H_2O_l + \frac{1}{2}O_{2(g)}$

C. $-\frac{K}{2.303}BrO^-_{3(aq)} + 6H^+_{(aq)} \rightarrow 3Br_{2(aq)} + 3H_2O_{(l)}$

D. All the three given options

Answer: C

View Text Solution

32. The unit of K for pseudo first order reaction is

A. minute^{-1}

B. $\text{mol}^{-1}l\text{litminute}^{-1}$

C. $\text{mol}^{-1}\ \text{lit}\ \ \text{minute}^{-1}$

D. mol^{-2} lit $^{2}\mathrm{minute}\hat{}(-1)$

Answer: B

View Text Solution

33. The half life period of the reaction $H_2 + I_2 \rightarrow 2HI$ is proportional to .....

A. initial concentration

B. the square of initial concentration

C. inverse of initial concentration

D. independent of initial concentration

Answer: C

View Text Solution

34. For the reactuon A+B $\rightarrow$ Products

$\frac{-d[A]}{dt} = x.e^{-E_a/RT}$,what is ?

A. Collision frequency

B. Molecularity

C. avogadro number

D. Rate constant

Answer: D

View Text Solution

35. Which of the following methods are used determine rate of the reaction containing more than one type of reactants?

(P)Intergrated rate equation method.

(Q)Half life method.

(R)Ostwald.s isolation method.

A. Only R

B. Q and R

C. P and Q

D. P.Q and R

Answer: A

View Text Solution

36. Activation energy of forward and backward non catalysed reaction are x and x. respectively.If they are done using catalyst the activation energy of forward and backward reactions are y and y. respectively ,then which of the following relation is true?

A. x-x.=y-y.

B. x-x. $<$ y-y.

C. x-x. $>$ y-y.

D. x-x. $\leq$ y-y.

Answer: A

View Text Solution

37. For the given reaction ,find the order of the reaction with respect to $[H^+]$

$$5Br^-_{(aq)} + BrO^-_{3(aq)} \Leftrightarrow 3Br_{2(aq)} + 3H_2O_l$$

A. 3

B. 2

C. 1

D. 4

Answer: B

View Text Solution

38. Which of the following statements is true regarding molecularity and order of reaction?

A. Order of the reaction can be determined from stoichiometry of the reaction

B. For the complex reaction,the fastes step decides order of the reection.

C. Molecularity cannot be defined for the reactions occuring in more than one step.

D. The order of the reaction for trimolecular reaction is always 2

Answer: C

View Text Solution

39. An elementary reaction occurs in a closed vessel.

$2CO_{(g)} + O_{2(g)}O_{2(g)} \rightarrow 2CO_{2(g)}$

If the volume of the reaction vessel is made one third of its original volume at constant temperature,the order of the reaction....of its original rate.

A. becomes twenty seven times

B. becomes nine times

C. becomes three times

D. becomes eighteen times

Answer: A

View Text Solution

40. With the help of which graph the valie of Arrhenius constant can be obtained from Arrhenius equation ,- K=A.$e^{-Ea/RT}$

A. log K versus $\frac{1}{\log T}$

B. K versus $\frac{1}{\log T}$

C. log K versus $\frac{1}{T}$

D. K versus T

Answer: C

View Text Solution

41. Which is correct relation for half life period $\left(1_{\frac{1}{2}}\right)$ and Initial concentraion of reactant $[R]_0$ for fourth order reaction.

A. $t_{\frac{1}{2}} \propto \frac{1}{[R]_0^{-3}}$

B. $t_{\frac{1}{2}} \propto \frac{1}{[R]_0}$

C. $t_{\frac{1}{2}} \propto \frac{1}{[R]_0^3}$

D. $t_{\frac{1}{2}} \propto [R]_0$

Answer: C

View Text Solution

42. According to collision theory Rate=$P.Z_{AB}\frac{e^{-Ea}}{RT}$ What does P indicate in the equation ?

A. pressure

B. Collision frequency

C. Arrhenius contant

D. Probability factor

Answer: D

View Text Solution

43. The unit of rate constant for third order reaction is ..

A. $\text{mole}^{-3}\text{lit}^{3}s^{-1}$

B. $\text{mole}^{-2}\text{lit}^{-2}s^{-1}$

C. $\text{molelit}^{-1}s^{-1}$

D. $\text{mole}^{-2}\text{lit}^{2}s^{-1}$

Answer: B

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44. The order of following reaction is .....

$$H_{2(g)} + Cl_{(g)} \xrightarrow{hv} 2HCl_{(g)}$$

A. 2

B. 1

C. 1.5

D. 0

Answer: D

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45. The decomposition reactiom of SO_2Cl_2 is the first order reaction.It.s concentration gets halved in 60 minutes what is its rate constant value?

A. 0.01155 $\min^{-1}$

B. 0.07676 $\min^{-1}$

C. 0.7676 $\min^{-1}$

D. 0.1155 minute^{-1}

Answer: A

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46. $3ClO^- \rightarrow ClO_3^- + 2Cl$

The rate of reaction of above reaction is given by.....

A. $K_1\left[ClO^-\right]$

B. $K_1\left[Cl^-\right]^2$

C. $K_1\left[ClO_2^-\right]$

D. $K_1\left[ClO^-\right]^2$

Answer: D

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47. What is the value of intercept for the graph of log [R] $\rightarrow$ time the first order reaction ?

A. $\frac{K}{2.303}$

B. In $[R]_o$

C. $-\frac{K}{2.303}$

D. log $[R]_o$

Answer: D

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48. For a reaction ,the value of slope of a plot in K $\rightarrow \frac{1}{T}$=.....

A. $-\frac{E_a}{2.303}$

B. $-\frac{E_a}{R}$

C. $-E_a$

D. $-\frac{E_a}{2.303R}$

Answer: B

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49. Which of the following realation is correct for zero order reaction?

A. $t_{\frac{1}{2}} \propto \frac{1}{[R]_0}$

B. $t_{\frac{1}{2}} \propto [R]_0$

C. $t_{\frac{1}{2}} \propto [R]_0$

D. $t_{\frac{1}{2}}$ is independent of $[R]_0$

Answer: B

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50. For the reaction 2A+B $\rightarrow$ product , $\frac{d[A]}{dt} = K[A]^2[B]$. What will be rate equation for $-\frac{d[B]}{dt}$?

A. $K[2A]^2[B]$

B. $\frac{1}{2}K[A]^2[B]$

C. $K[A][B]^2$

D. $K[A][B]^{\frac{1}{2}}$

Answer: B

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51. the units for the rate constant and the rate of reaction are same for a reaction .What will be the order reaction

A. Second

B. zero

C. First

D. Third

Answer: B

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52. What is the value of slope of graph $\log_{10} K \rightarrow \frac{1}{T}$?

A. $-\frac{K}{2.303}$

B. $-\frac{E_a}{2.303R}$

C. $-\frac{E-(a)}{R}$

D. $-K$

Answer: B

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53. Which of the following relation is correct for first dual reaction?

A. Reaction order =molecularity

B. Reaction order $\leq$ molecularity

C. Reaction order $>$ molecularity

D. Reaction order $<$ molrcularity

Answer: A

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