doubtnut
India's Number 1 Education App

CHEMISTRY

BOOKS - V PUBLICATION

CHEMICAL KINETICS

Question Bank

1. For the reaction $R \rightarrow P$,the concentration of a reactant change from 0.03 M to 0.02M in 25 minutes. Calculate the average rate of reaction using units of time and seconds.

Watch Video Solution

2. In a reaction ,$2A \rightarrow$ product, 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.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

6. Time required to decompose $SO_2CL_\circ$ to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction.

Watch Video Solution

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

Watch Video Solution

8. The rate of a chemical reaction doubles for an increases of 10 K in absolute temperature from 298 K. Calculate E_e.

Watch Video Solution

9. The activation energy for the reaction,$2HI(g) \rightarrow H_2(g) + I_2(g)$is $209.5kjmol^{-1}$at 581 K.Calculate the fraction of molecules of reactant having energy equal to or greater than activation energy.

Watch Video Solution

10. For the reaction $3NO(g) \rightarrow NO_2(g) + NO(g)$,Rate=$k[NO]^2$ .Determine the dimension of k in the above reaction.

Watch Video Solution

11. For the reaction: 2A+B→A 2 B, the rate =k[A[B]2 with k=2.0×10^−6mol^−2L ^2 s^−1. Calculate the initial rate of the reaction when [A]=0.1molL −1 ,[B]=0.2 molL −1 . Calculate the rate of reaction after [A] is reduced to 0.06 molL −1

Watch Video Solution

12. The decomposition of NH_3on the surface of metal like platinum is a zero order reaction. What is the unit of the rate constant k for this reaction?

Watch Video Solution

13. The decomposition of dimethyl ether leads to the formation of $(CH)_4$ and $(H)_2$ and (CO) and the reaction rate is given by Rate $= (k)\left[(CH)_3(OCH)_3\right]^{\frac{3}{2}}$ The rate of reaction is followed by increase in pressure in a closed vessel, so the rate can also be expressed in terms of the partial pressure of dimethyl ether, i.e., Rate=$(k)P(CH)_3(OCH)_3^{\frac{3}{2}}$ If the pressure is measured in bar and time in minutes, then what are the units of rate and rate constants?

Watch Video Solution

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

Watch Video Solution

15. A reaction is second order with respect to a reactant. How is the rate of reaction affected. if the concentration of the reactant is (i) doubled

Watch Video Solution

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

Watch Video Solution

17. In a pseudo first order hydrolysis of ester in water, the following results were obtained: i) Calculate the average rate of reaction between the time interval 30 to 60 seconds. ii) Calculate the pseudo first order rate constant for the hydrolysis of ester. (##VPU_HSS_CHE_XII_C04_E02_008##)

Watch Video Solution

18. A reaction is first order in A and second order in B.Write the differential rate equation for the reaction.

Watch Video Solution

19. In a reaction between (A) and (B), the initial rate of reaction (r_o) 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) ? (##VPU_HSS_CHE_XII_C04_E02_010##)

Watch Video Solution

20. The following results have been obtained during the kinetic studies of the reaction: $2A + B \rightarrow C + D$ Determine the rate law and the rate constant for the reaction. (##VPU_HSS_CHE_XII_C04_E02_011##)

Watch Video Solution

21. The reaction between A and B is first order with respect to A and zero order with respect to B. Fill in blanks in the following table: 1)A and B =0.1,Initial rate=2.0*10^2, 2)B=0.2 and initial rate=4.0*10^2,3)A=0.4 and B=0.4,4)B=0.2 and initial rate =2.0*10^2

Watch Video Solution

22. Calculate the half-life of a first order reaction from their rate constants given below: i) $200(s)^{-1}$

Watch Video Solution

23. The half-life for radioactive decay of 14_C is 5730 years. An archaeological artifact containing wood had only 80 % of the 14_Cfound in a living tree. Estimate the age of the sample.

Watch Video Solution

24. The Experiment data for decomposition of $N\{2\}O\{5\}$ $[2N\{2\}O\{5\} \rightarrow 4NO\{5\} + O\{2\}]$ is gas phase at 318 K are given below: i) Plot $[N\{2\}O\{5\}]$ against t. ii) Find the half-life period for the reaction. iii) Draw a graph between $\log[N\{2\})\{5\}]$ and t iv) What is the rate law Calculate the rate constant. vi) Calculate the half life period from K and compare it with(2) t/s=0,400,800,1200,1600,2000,2400,2800,3200 and [N2O5]=1.63,1.36,1.14,0.93,0.78,0.64,0.53,0.43,0.35 respectively

Watch Video Solution

25. 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 `1 / 16th value?

Watch Video Solution

26. During nuclear explosion, one of the products is 90_{Sr} with half-life of 28.1 years. If $1\mu g$ of 90_{Sr} was absorbed in the bones of a newly born baby

instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

Watch Video Solution

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

Watch Video Solution

28. A first order reaction takes 40 min for 30 % decomposition. Calculate $t^{\frac{1}{2}}$

Watch Video Solution

29. For the decomposition of azoisopropane to hexane and nitroger at $543K$, the following data are obtained. Calculate the rate constant. t=0,360S,720S and P=35,54,63 respectively.

Watch Video Solution

30. The following data were obtained during the first order thermal decomposition of $(SO)_2(Cl)_2$ at a constant volume, $(SO)_2(Cl)_2(g) \rightarrow (SO)_2(g) + (Cl)_2(g)$ Calculate the rate of the reaction when total pressure is 0.65 atm.t=0,100s and total pressure is 0.4,0.7 respectively.

Watch Video Solution

31. The rate constant for the decomposition of $(N)_2(O)_5$ at various temperatures is given below: Draw a graph between log kand $\frac{1}{T}$ and calculate the values of (A) and E_a. Predict the rate constant at 30^oC and 50^oC. (##VPU_HSS_CHE_XII_C04_E02_022##)

Watch Video Solution

32. The rate constant for the decomposition of hydrocarbons is $2.418x10^{-5}(s)^{-1}$ at $546(\sim K)$. if the energy of activation is $179.9\frac{kJ}{mol}$, what wilt be the value of pre-exponential factor:

Watch Video Solution

33. Consider a certain reaction $A \rightarrow Products$ with $k = 2.0 \times 10^{-2}(s)^{-1}$ .Calculate the concentration of A remaining after 100s if the initial concentration of A is 1.0 $molL^{-1}$

Watch Video Solution

34. Sucrose decomposes in acid solution into glucose and fructose according to the first order rate law, with $t_{\frac{1}{2}} = 3.00$ hours. What fraction of sample of sucrose remains after 8 hours?

Watch Video Solution

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

Calculate E_a.

Watch Video Solution

36. The rate constant for the first order decomposition of $(H)_2(O)_2$ is given by the following equation: $\log k = 14.34 - 1.25 \times 10^4 \frac{K}{T}$ Calculate E_a for this reaction and at what tem perature will its half-period be 256 minutes?

Watch Video Solution

37. The decomposition of A into product has value of k as 4.5 × 103 s1 at 10°C and energy of activation 60 kJ mol-1. At what temperature would k be 1.5 × 104s-1

Watch Video Solution

38. The time required for $10\,\%$ completion of a first order reaction at $298(K)$ is equal to that required for its $25\,\%$ completion at $308K$. If the value of A is $4 \times 10^{10}(s)^{-1}$. Calculate (k) at $318(K)$ and (Ea).

Watch Video Solution

39. The rate of a reaction quadruples when the temperature changes from $293(\sim K)$ to $313(\sim K)$. Calculate the energy of activation of the reaction assuming that it does not change with temperature.

Watch Video Solution

40. The half-life for radioactive decay of 14_C is 5730 years. An archaeological artifact containing wood had only 80 % of the 14_Cfound in a living tree. Estimate the age of the sample.

Watch Video Solution

41. For the reaction $3NO(g) \rightarrow NO_2(g) + NO(g)$,Rate=$k[NO]^2$.What is the order of the reaction?

Watch Video Solution

42. Some statements related to kinetic are given below.The number of reactant molecules whose concentration changes can determine the rate.

Watch Video Solution

43. "A complex reaction consists of a number of steps. The overall rate of the reaction depends on the' slowest step" Illustrate the above statement with ąn example and also mention the mechanism.

Watch Video Solution

44. "Activation energies are low for fast reaction and high for slow reactions" a) Justify the statement. b) The rate of a reaction quadruples

when the temperature changes from 310 K to 330 K. Calculate the activation, energy of the reaction $R = 8.314 Jk^{-1}(mol)^{-1}$

Watch Video Solution

45. Assuming that energy of activation for most of the reactions is 52 (kJ), what conclusion you draw-about the effect of temperature on the rate of a reaction [Based on Arrhenius equation]

Watch Video Solution

46. Write the elementary steps of the reaction $2O_3 \leftrightarrow 3O_2$ and hence derive the rate law expression for this reaction. Comment as the order of the reaction.

Watch Video Solution

47. For the reaction. $2FeCl_3 + SnCl_2 \rightarrow 2FeCl_2 + SnCl_4$ What is the order and molecularity of the reaction?

Watch Video Solution

48. NH_3 decomposes as follows: $2NH_3 \rightarrow N_2 + 3H_2$ $-d\frac{NH_3}{dt} = k_1[NH_3] + d\frac{N_2}{dt} = K_2[NH_3] + d\frac{H_2}{dt} = k_3[NH_3]$ derive the relationship between k_1, k_2 and k_3

Watch Video Solution

49. What aspect of a reaction is infuenced by presence of catalyst which increases the rate or possibility of the reaction?

Watch Video Solution

50. Give an example of a reaction having fractional order?

Watch Video Solution

51. Give an example of 1st order reaction?

Watch Video Solution

52. For the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, how are the rate of reaction expressions $-d\frac{H_2}{dt}$ and $d\frac{NH_3}{dt}$ interrelated?

Watch Video Solution

53. Rate of reaction is given by $rate = k[A]^2[B]$ what are the units for the rate and the rate contant for this reaction?

Watch Video Solution

54. For the decomposition of N_2O_5, rate law is rate $= (k)[N_2O_5]$ what is the significance of k in this equation?

Watch Video Solution

55. Write the expression,for half life of the reaction between hydrogen and chlorine to form hydrochloric acid gas?

Watch Video Solution

56. What Is the rate of disappearance of hydrogen in the reaction ? $3H_2 + N_2 \rightarrow 2NH_3$

Watch Video Solution

57. Why a reaction does not proceed with a uniform rate throughout or why instantaneous rate is preferred over average rate?

Watch Video Solution

58. Why does boiling of an egg or cooking. of rice in an open vessel take more time at a hill station?

Watch Video Solution

59. In some cases, it is found that a large number of colliding molecules have energy more than threshold value, yet the reaction is slow. Why?

Watch Video Solution

60. What is the fraction of molecules having energy equal to or greater than activation energy Ea. What is this quantity called?

Watch Video Solution

61. Can a reaction have zero activation energy?

Watch Video Solution

62. On the basis of enthalpy of formation, graphite is more stable than diamond, yet diamond does not change into graphite for years. Explain why?

Watch Video Solution

63. Why coal does not burn itself in air but once initiated by flame, it continuous to burn?

Watch Video Solution

64. Can a reaction have negative activation energy?

Watch Video Solution

65. What is the value of rate constant at extremely high temperature (T=infinity) Is this rate constant feasible? Why?

Watch Video Solution

66. A 1st order reaction takes 69.3 minutes for 50 %completion. Derive an equation for determining the time needed for 80 % completion of this reaction.

Watch Video Solution

67. For a 1st order reaction, time taken for half of the reaction to complete is t, whereas that for3/4 th of the reaction to complete is t_2. How aret_1 and t_2, related to each other?

Watch Video Solution

68. What is the effect of adding catalyst on the free energy change (Delta G) of a reaction?

Watch Video Solution

69. For the reaction $P \to Q$ rate of the reaction is expressed by $-d\frac{p}{dt}$ or $+d\frac{Q}{dt}$. What is the significance of plus and minus sigins in this case?

Watch Video Solution

70. Consider the reaction. $(NO)_2 + (CO) \to (NO) + (CO)_2$ Answer the following questions. a) Write down the 2 steps through which the reaction takes place? b) Find out the slowest step? c) Which is the rate determining step? d) Find out the order of the reaction?

Watch Video Solution

71. Write the expression showing the change of concentration with time in the exponential form for reactions of 1 st order?

Watch Video Solution

72. The activation energy of a reaction is zero. Will the rate constant of the reaction depend upon temperature? Give reason.

Watch Video Solution

73. The specific reaction rate of a reaction is $6.2x10^{-3}(mol)(L)^{-1}(s)^{-1}$. What is the order of the reaction?

Watch Video Solution

74. A substance with initial concentration 'a' follows zero order kinetics. In how much time will the reaction go to completion?

Watch Video Solution

75. The reaction $A + 2B \rightarrow C$ obeys the rate equation`rate=k[A]^0.5[B]^1.5 what is the order of the reaction?

Watch Video Solution

76. A reaction is 50 % complete in 2 hours and 75 % complete in 4 hours . What is the order of the reaction?

Watch Video Solution

77. a) The units of the rate constant K for two therefore different reactions are give: i) $(mol)(L)^{-1}(S)^{-1}$ ii) $\left(\frac{mol}{L}\right)^{-1}(S)^{-1}$ Against each of these units write the re-spective order of the reaction:

Watch Video Solution

78. A relation connecting rate constant and temperature is called Arrhenius equation. a) Write the equation

Watch Video Solution

79. Consider the reaction. $(NO)_2 + (CO) \rightarrow (NO) + (CO)_2$ Answer the following questions. a) Write down the 2 steps through which the reaction takes place? b) Find out the slowest step? c) Which is the rate determining step? d) Find out the order of the reaction?

Watch Video Solution

80. The term order and molecularity are common in chemical kinetics. What do you mean by order and molecularity?

Watch Video Solution

81. Choose the correct answer. a) The equation for $t_{\frac{1}{2}}$ of first order reaction is i) $t_{\frac{1}{2}} = \frac{0.693}{K}$ ii) $t_{\frac{1}{2}} = \left[\frac{A_o}{2_K}\right]$

Watch Video Solution

82. A given sample milk turns sour at room temperature (20^oC) in 64 hours. In a refrigerator at (3^oC), milk can be stored three times as long before it sours. Estimate (a) the activation energy for souring of milk (b) how long it take milk to sour at (40^oC)

Watch Video Solution

83. The energy of activation for a reaction is $100(kJ)mol^{-1}$. Presence of a catalyst lowers the energy of activation by 75 %. What will be the effect on the rate of reaction at (20^oC), other things being equal.

Watch Video Solution

84. Ethylene is produced$C_4H_8 \rightarrow \delta 2C_2H_4$ The rate constant 'is `2.48 xx 10^(-4) (sec)^(-1) . In what time cyclobutane will the molar ratio of the ethylene to cyclobúane in reaction mixture attain the value (a) 1 (b) 100 .

Watch Video Solution

85. A gas phase decomposition of dimethyl either follows the 1st order kinetics $CH_3OCH_3CH_3OCH_3 \leftrightarrow CH_4(g) + H_2\_(g) + CO_{(g)}$. The reaction is carried out in a costant volume container at (500^oC) and has a half life period of 14.5 (min). Initially only dimethyl ether is present at a pressure of 0.4 atmosphere. What is the total pressure of the system after 12 (min) ? Assume Ideal behaviour

Watch Video Solution

86. The rate of decomposition of amnionia is found to depend upon the concentration of NH_3 according to the equation

$-d\frac{NH_3}{dt} = K_1\frac{NH_3}{1_{+K_2[NH_3]}}$ What is the order of the reaction when i) concentration of NH_3 is very high ii) concentratiod of NH_3 is'verý

Watch Video Solution

87. For a first order reaction, derive expression for the degree of dissociation of the reactant in the exponential form.

Watch Video Solution

88. NH_3 decomposes as follows: $2NH_3 \rightarrow N_2 + 3H_2$ $-d\frac{NH_3}{dt} = k_1[NH_3] + d\frac{N_2}{dt} = K_2[NH_3] + d\frac{H_2}{dt} = k_3[NH_3]$ derive the relationship between k_1, k_2 and k_3

Watch Video Solution

89. In the Arrhenius equation for a first order reaction, the value of A and E_a are $4 \times 10^{13}\,\sec^{-1}$ and 98.6 kj mol^-1 respectively. At what

temperature will its half life be 10 minutes?

Watch Video Solution

90. Find the two third life $t_{\frac{2}{3}}$ of a 1st order reaction in which $k = 5.48 \cdot 10^{-14} \sec^{-1}$.

Watch Video Solution

91. In a reaction, a substance A undergoes decomposition which is catalysed in presence of a finely divided catalyst. If there are enough sites on the catalyst so that 20 molecules of A react per second. What is the rate of the reaction for a 1M solution?

Watch Video Solution

92. A 1st order reaction takes 69.3 minutes for 50 %completion. Derive an equation for determining the time needed for 80 % completion of this

reaction.

Watch Video Solution

93. A gas phase decomposition of dimethyl either follows the 1st order kinetics $CH_3OCH_3CH_3OCH_3 \leftrightarrow CH_4(g) + H_2\_(g) + CO_{(g)}$. The reaction is carried out in a costant volume container at (500^oC) and has a half life period of 14.5 (min). Initially only dimethyl ether is present at a pressure of 0.4 atmosphere. What is the total pressure of the system after 12 (min) ? Assume Ideal behaviour

Watch Video Solution

94. Write the expressions for rates of reactions in terms of concentration of reactants and products for the following reactions: i) $2(N)_2(O)_s \leftrightarrow 2(N)_2(O)_4 + (O)_2$ ii) $2(NO)_2 + (F)_2 \leftrightarrow 2(NO)_2(F)$

Watch Video Solution

95. For the reaction, $2N_2O_5(g) \leftrightarrow 4NO_2(g) + O_2(g)$. If the concentration of NO_2 increases by $3.0 \times 10^{-3} molL^{-1}$ in six seconds then what is the rate of reaction?

Watch Video Solution

96. For the reaction, $2N_2O_5(g) \leftrightarrow 4NO_2(g) + O_2(g)$. If the concentration of NO_2 increases by $3.0 \times 10^{-3} molL^{-1}$ in six seconds then what is the rate of reaction?

Watch Video Solution

97. The rate of formation of nitric oxide (NO) in the following reaction is $3.6 \times 10^{-3} (molL)^{-1} (s)^{-1} 4NH_3(g) + 5O_2(g) \leftrightarrow 4NO(g) + 6H_2O(g)$

Find the rate of disappearance of oxygen.

Watch Video Solution

98. Identify the order of the reactions for which the rate constants are: iii) $6.2 \times 10^{-2}(L)(mol)^{-1}(s)^{-1}$

Watch Video Solution

99. For the reaction $(Cl)_2(g) + 2(NO)(g) \rightarrow 2(NOCl)(g)$ the rate law is expressed as rate $= (k)\left[(Cl)_2\right][(NO)]^2$ What is the overall order of this reaction.

Watch Video Solution

100. State the order with respect to each reactant, order of overall reaction and units of rate constant in each of the following reactions. i) $H_2O_2 + 3I^- + 2H^+ \rightarrow 2H_2O + I_3^-((aq))$ Rate $= k[H_2O_2]\left[I^-\right]$ ii) $CO + Cl_2 \rightarrow (COCl)_2$ .Rate $= k[(CO)]^2\left[(Cl)_2\right]^{\frac{1}{\alpha}}$ iii) $(CH)_3(CHO) \rightarrow (CH)_4 + (CO)$ Rate $= (k)\left[(CH)_3(CHO)\right]^{\frac{3}{2}}$

Watch Video Solution

101. For the reaction at $500(K)\ NO_2(g) + CO(g)^{\cdot} \rightarrow CO_2(g) + NO(g)$ the proposed mechanism is as follows: i) $(NO)_2 + (NO)_2 \rightarrow (NO) + (NO)_3$ (slow) ii) $(NO)_3 + (CO) \rightarrow (CO)_2 + (NO)_2$ (fast) What is the rate law for the reaction?

Watch Video Solution

102. A reaction is second order with respect to a reactant. How is the rate of reaction affected. if the concentration of the reactant is (i) doubled

Watch Video Solution

103. A first order reaction has rate constant of $10^{-2}(\sec)^{-1}$. Calculate the half life period for this reaction.

Watch Video Solution

104. The half life period of a reaction of first order is 100 sec. Calculate its rate constant.

Watch Video Solution

105. A first order reaction takes 5 minutes for the initial concentration of $0.6(mol)(L)^{-1}$ to become $0.4(mol)(L)^{-1}$. How long will it take for the initial concentration to become $0.3(mol)(L)^{-1}$?

Watch Video Solution

106. A first order reaction is 75 % complete in 60 minutes: Find the hatf-life of this.reaction.

Watch Video Solution

107. The reaction SO2Cl2 → SO2+Cl2, is ạ first order reaction with half life 3.15×10^4 at (320^oC) What percentage of `SO2 Cl2 would be

decomposed on heating at (320^oC) for 90 minutes?

Watch Video Solution

108. The value of rate constant for the decomposition of nitrogen peroxide, $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$ is $3.46 \cdot 10^{-5}$ at 25 degree celcius and` 4.87*10^-3 at 65 degree celcius. Calculate the énergy of activation for the reaction. (R=8.314] (k)^(-1) (mol)^(-1)

Watch Video Solution

109. In general it is observed that the rate of a chemical reaction doubles with every 10° rise in temperature. If this generalisation holds for a reaction in the temperature range $295(\sim K) \rightarrow 305(\sim K)$, what would be the value of activation energy for this reaction? (R)=8.314 (Jk)^(-1) (~mol)^(-1)`

Watch Video Solution

110. In a reversible reaction both side rates of a reaction are : same, different, one side more, reactant rates less

A. same

B. different

C. one side more

D. reactant rates less

Answer: A

Watch Video Solution

111. The rate of a chemical reaction : increases as the reaction proceeds, decreases as the reaction proceeds, may increase or decrease during the reaction, remains constant as the reaction proceeds

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

Watch Video Solution

112. For the reaction at $500(K)$ $NO_2(g) + CO(g)^{\cdot} \rightarrow CO_2(g) + NO(g)$ the proposed mechanism is as follows: i) $(NO)_2 + (NO)_2 \rightarrow (NO) + (NO)_3$ (slow) ii) $(NO)_3 + (CO) \rightarrow (CO)_2 + (NO)_2$ (fast) What is the rate law for the reaction?

A. $rate = -d\frac{NO_2}{dt}$

B. $rate = -d\frac{CO_2}{dt}$

C. $rate = d[NO_2] - d\frac{CO}{dt}$

D. $rate = d\frac{CO_2}{dt}$

Answer: A

Watch Video Solution

113. In a reaction $2A + B \rightarrow A_2B$ the reactant A will disappear at : half the rate at that B will decrease, the same rate at the B will decrease, the same rate at that A, B will form, twice the rate at that B will decrease

A. half the rate at that B will decrease

B. the same rate at the B will decrease

C. the same rate at that A, B will form

D. twice the rate at that B will decrease

Answer: D

Watch Video Solution

114. For a chemicai reaction $(A) \rightarrow (B)$ it is found that the rate of the reaction guadruples when the concentration of (A) is doubled.The rate

expression for the reaction is rate $= (k)[(A)](n)$, where the value of (n) is a)1 b)2 c)0 d)3

A. 1

B. 2

C. 0

D. 3

Answer: B

Watch Video Solution

115. In a reversible reaction $2NO_2 \leftrightarrow N_2O_4$ the rate of disapperance of NO_2 is equal to : $\left(\left(2\frac{(k)_1}{(k)_2}\right)\left[(NO)_2\right]^2\right.$, $2K_1[NO_2]^2 - 2k_2[N_2O_4]$ $2k_1[NO_2]^2 - k_2[N_2O_4]$, $(2K_1 - k_2)(NO_2)$

A. $\left(2(k)_1(k)_2\left[(NO)_2 right\right]^2$

B. $2K_1[NO_2]^2 - 2k_2[N_2O_4]$

C. $2k_1[NO_2]^2 - k_2[N_2O_4]$

D. $(2K_1 - k_2)(NO_2)$

Answer: B

Watch Video Solution

116. In which of the following cases, does the reaction go farthest completion (k)=10^(2) k=10^(-2) k=10 k=1

A. (k)=10^(2)

B. k=10^(-2)

C. k=10

D. k=1

Answer: A

Watch Video Solution

117. Decomposition of NH_3 on the surface of tungsten is a reaction of : zero order, first order, second order, fractional order

A. zero order

B. first order

C. second order

D. tional order

Answer: A

Watch Video Solution

118. The rate of a gaseous reaction is given by the expression $k[C][D]$. If the volume of the reaction vessel is suddenly reduced to $\frac{1}{4}$ th of the initial volume, the reaction rate relating to original rate will be : 1/10, 1/8, 8, 16

A. (1)(10)

B. (1)(8)

C. 8

D. 16

Answer: D

Watch Video Solution

119. The rate of the reaction is primarily determined by the slowest step. This step is called rate determination step activation step reaction rate step none of these

A. rate determination step

B. activation step

C. reaction rate step

D. none of these

Answer: A

Watch Video Solution

120. The rate constant $k = Pz(e)^{\frac{-Ea}{(RT)}}$ which factor should show a decrease for the reaction to proceed more rapidly? T, Z, E, p

A. T

B. Z

C. E

D. p

Answer: C

Watch Video Solution

121. Which of the following statement true for molecularity of a reaction? It is sum of exponents of the molar concentration of the reactants in the rate equation, It may have a fractional value, It is the number of

molecules of the reactants taking part in a single step chemical reaction, It is determined experimentally

A. It is sum of exponents of the molar concentration of the reactants in the rate equation

B. It may have a tional value

C. It is the number of molecules of the reactants taking part in asingle step chemical reaction

D. It is determined experimentally

Answer: C

Watch Video Solution

122. A zero order reaction. $f(A) \rightarrow$ products has rate constant $10^{-2}(mol)(L)^{-1}(s)^{-1}$ of a process started with 10 moles of A in a one litre vessel, how many moles of A would be left unreacted after 10 minutes

A. 10

B. 5

C. 6

D. 4

Answer: D

Watch Video Solution

123. The temperature coefficient of most of the reaction lies between 1 and 3 2 and 3 1 and 4 2 and 4

A. 1 and 3

B. 2 and 3

C. 1 and 4

D. 2 and 4

Answer: B

Watch Video Solution

124. A zero order reaction is one whose rate is independent of temperature of the reaction concentration of the reactants concentration of the products the material of the vessel in which the reaction is carried out

A. temperature of the reaction

B. concentration of the reactants

C. concentration of the products

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

Answer: B

Watch Video Solution

125. A unimolecular reaction is : $2HI \rightarrow \mathrm{H}_2 + I_2$, $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$, $H_2 + Cl_2 \rightarrow 2HCl$, $PCl_3 + Cl_2 \rightarrow P\dot{C}l_5$

A. $(2HI) \rightarrow \quad \mathrm{H}_{\ 2} + 1_2$

B. $(N)_2(O)_5 \rightarrow (N)_2(O)_4 + (1)(2)(O)_2$

C. $(H)_2 + (Cl)_2 \rightarrow 2(HCl)$

D. $(PCl)_3 + (Cl)_2 \rightarrow (P\dot{C}l)_5$

Answer: B

Watch Video Solution

126. The inversion of can suagr $C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$. It is a reaction of : second order, pseudounimolecular, unimolecular, none of these

A. second order

B. pseudounimolecular

C. unimolecular

D. none of these

Answer: D

Watch Video Solution

127. The rate constant, activation energy and the Arrhenius parameter of a chemical reaction at $25^{\circ}(C)$ are $3x10^{-4}$, $(s)^{-1}$, $104.4kJ(mol)^{-1}$ and $6 \times 10^{14}(s)^{-1}$ respectively. The value of the rate ćonstant as $\mathbf{T} \to \alpha$ is

A. 2 xx 10^(18) cdot (s)^(-1)

B. 6 xx 10^(14) (s)^(-1)

C. infinity

D. 3.6 xx 10^(3 0) (s)^(-1)

Answer: B

Watch Video Solution

128. Unit of rate constant for zero order reaction is

A. mol (L)^(-1) (s)^(-1)`

B. $(mol)^{-1\cdot}(L)(s)_i^{-1}$

C. $(s)^{-1}$

D. (mol)_(-2) L^(2) s^(-1)

Answer: A

Watch Video Solution

129. For the reaction $(N)_2 + (3H)_2 \rightarrow 2(NH)_3$, if $\frac{NH_3}{\delta}t = 2 \cdot 10^{-4}$ $molL^{-1}s^{-1}$ the value of $-\delta\frac{H_2}{\delta_t}$

A. $1 \times 10^{-4}(mol)(L)^{-1}(s)^4$

B. $3 \times 10^{-4}(mol)^2(L)^{-1}(s)^{-1}$

C. $4 \times 10^{-4}(mol)(L)^{-1}(s)^{-1}$

D. $6 \times 10^{-1}(mol)'(L)^{-1}(s)^{-1}$

Answer: B

Watch Video Solution

130. In the reaction $A + 2B \rightarrow C + 2D$ initial rate $-d\frac{A}{dt} = 2.6 \cdot 10^{-2} Ms^{-1}$ at t= 0. What is the value of $-d\frac{B}{dt}$ at t=0 in $Ms - 1$?

A. 2.6 xx 10^(-2)

B. 5.2 xx 10^(-2)

C. 1 xx 10^(-1)

D. +6.5 xx 10^(-3)

Answer: B

Watch Video Solution

131. Diazonium salt decomposes as $\mathbf{C}_6(H)_5(\sim N)_2^+(Cl) - \rightarrow (C)_6(H)_5(Cl) + (N)_2$. At $0^\circ(C)$ the'

evolution of $(N)_2$ becoomes two times faster when the initial concentration of the salt is doubled. Therefore it is

A. a first order reaction

B. second order reaction

C. Independent of the initial concentration of the salt

D. a zero order reaction

Answer: A

Watch Video Solution

132. For the reaction $(A)+(B)\rightarrow(C)+(D)$, doubling the concentration of both the reactants increases the reaction rate by 8 times and doubling the concentration of only B just dobles the reaction rate. The rate law is given as

A. $r=k^{\cdot}[A]^{\frac{1}{2}}\cdot[B]^{\frac{t}{2}}$

B. r=k[A][B]^(2)

C. $r = k[A]^2[B]$

D. $r = k[A][B]$

Answer: C

Watch Video Solution

133. A first order reaction has specific reaction rate $2(\ \min\ )^{-1}$. The half life of the reaction' will be

A. 1.653 min

B. 0.347 min

C. 2 min

D. 0.0347min

Answer: B

Watch Video Solution

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

A. 112

B. 512

C. 400

D. 614

Answer: B

Watch Video Solution

135. In Arrhenius plot, the intercept is equal to

A. (E a)(R)

B. In A

C. In k

D. log _(10) a

Answer: B

Watch Video Solution

136. A chemical reaction was carried out at $300(\sim K)$ and $280K$. The rate constants were found to be $\mathbf{k}_1$ and (k)_2respeetively. Then

A. `k_(2)=4 k_(1)

B. $(k)_2 = \ +2(k)_1$

C. $k_2 = 0.25k_1$

D. $k_2 = 0.5k_1$

Answer: C

Watch Video Solution

137. The minimum energy required to permit a reaction is

A. internal energy

B. threshold energy

C. activation energy

D. free energy

Answer: B

Watch Video Solution

138. In a first order reaction $\mathbf{A} \rightarrow (B)$ if (k) is rate con stant and initial concentration of the reactant A. is 0.5. M then the.half life is

A. $(\ln 2)(k)$

B. $(0.693)(0.5(k)$

C. (operatorname(tog) 2)((k))

D. $(\log 2)(k)\sqrt{0.5}$

Answer: A

Watch Video Solution

139. Collision theory is applicable to

A. first order reaction

B. zero order reaction

C. bimolecular reaction

D. intramolecular reaction

Answer: C

Watch Video Solution

140. For a 1st order reaction, half life is 14 sec. The time required for the initial concentration to reduce to $(1)(8)$ of its value is

A. $(14)^3(\sec)$

B. 28 sec

C. 42 sec

D. $(14)^2 \cdot \sec$

Answer: C

Watch Video Solution

141. Plot a graph showing variation in the concentration of reactants against time for a zero order reaction.

A. linear with +ve slope and zero intercept

B. linear with -ve slope and zero intercept

C. linear with -ve slope and non zero intercept

D. a curve asymptotic to concentration axis

Answer: C

Watch Video Solution

142. The rate of reaction between two reactants A and (B) decreases by a factor of 4 if the concen tration of reactarit B ' is doubled. The order of this reaction with respect to the reactant B is

A. 2

B. -1

C. 1

D. -2

Answer: D

Watch Video Solution

143. Order of the photochemical reaction occurlng between Hydrogen and Chlorine is

A. zero order

B. first order

C. second order

D. third order

Answer: A

Watch Video Solution

144. The reaction $(H)^{+} + (O)(H)^{-} \rightarrow (H)_2(O)$ is

A. very slow

B. slow

C. fast

D. moderate in speed

Answer: C

Watch Video Solution

145. The time taken for 90% of 1st order reaction to complete is approximately

A. 1.1 xx that of half life

B. 2.2 xx that of half life

C. 3.3 xx that of half life

D. 4.4 xx that of half life

Answer: C

Watch Video Solution

146. The rate law for a reaction between the substances (A) and (B) is given by, rate =k $[\mathbf{A}]^n[(\sim B)]^{(m)}$ On doubling the concentration of (A) and halving the concentration of B, the ratio of the new rate to the earlier rate of the reaction will be

A. m+n

B. n-m

C. $2^n - (m)$

D. `2 ^ 1 /m+n

Answer: C

Watch Video Solution

147. For a reaction $(1)(2)\mathbf{A} \rightarrow 2(\sim B)$, rate of disappearance of (A) is related to the rate of appearance of $\mathbf{B}$ by the ĕxpression

A. $-(d[A])(dt) = (d[B])(v \cdot dt'$

B. $-(d)[(A)](d)(dt) = 4(d)[(B)](dt)$

C.

D. -`(d)[(A)](dt)=(1)(4) (d)[(B)](dt)

Answer: D

Watch Video Solution

148. If I is, the intensity of absorbed light and 'C' is the concentration of (AB) for the photochemical process $AB + hv \rightarrow AB^{\cdot}$ the rate of formation of $AB \cdot$ is directly proportional to : $C, I, \mathbf{I}^2, CI$

A. C

B. 1

C. mathbf(I)^(2)

D. I

Answer: B

Watch Video Solution

149. The reaction $\mathbf{A} \rightarrow \mathbf{B}$ follows first order kinetics.The time take for 0.8 mole of A to produce 0.6 mole of B is 1 hour. What is the time taken for conversion of 0.9 mole of A to produce 0.675 mole of $\mathbf{B}$.

A. 1 hour

B. 0.5 hour

C. 0.25 hour

D. 2 hours

Answer: A

Watch Video Solution

150. $3A \rightarrow 2B$ rate of reaction $d\frac{[B]}{dt}$ is equal to : $\frac{-3}{2}d\frac{[A]}{(dt)}, \frac{-2}{3}d\frac{[A]}{dt}$, $\frac{-1}{3}d\frac{[A]}{dt}, 2d([A])(dt)$

A. $(-3)(2)(d)[(A)](dt)'$

B. $(-2)(3)(d)[(A)])(\cdot(dt)$

C. $(-1)(3)(d)[(A)])(dt)$

D. $2(d)[(A)](d)(t)$

Answer: B

Watch Video Solution

151. D D T an exposure to water decomposes. Half life = 10 years. How much time will it take for its 99% decomposition?50 years, 66.5 years, 500 years, 700 years

A. 50 years

B. 70 years

C. 500 years

D. 700 years

Answer: B

Watch Video Solution

152. Which of the following reactions ends in finite time?zero order, first order, second order, third order

A. zero order

B. first order

C. second order

D. third order

Answer: A

Watch Video Solution

153. The half lives of two samples are 0.1 and 0.4 second. 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

Watch Video Solution

154. Activation energy is

A. Threshold energy + average kinetic energy

B. Threshold energy - average kinetic energy

C. Threshold energy + potential energy

D.

Answer: B

Watch Video Solution

155. The rate constants k_1 and k_2 for two different reactions are $10^{16} \times e\frac{-2000}{T}$ and $10^{15} \times e\frac{-1000}{T}$ respectively. The temperature at which $k_1 = k_2$ is : $1000k$, $\frac{2000}{2.303}k$, $2000k$ $\frac{1000}{2.303}k$

A. 1000k

B. (2000)(2.303) (k)

C. 2000k

D. (1000)(2.303) (k)

Answer: D

Watch Video Solution

156. The reaction $2(FeCl)_3 + (SnCl)_2' \rightarrow 2(FeCl)_2 + (SnCl)_4$ is an example of

A. 1st order reaction

B. 2nd order reaction

C. 3rd order reaction

D. none of these

Answer: C

Watch Video Solution

157. The half life of a reaction is halved as the intial concentration of the rectant is doubled. The order of the reaction is

A. 0.5

B. 1

C. 2

D. 0

Answer: C

Watch Video Solution

158. Rate of a reaction can be expressed by-Arrhenius equation , k=Ae ^ -Ea/RT. In this equation (Ea) represents (1)The total energy of the reacting molecules at a temperature. (2)The fraction of molecules with energy greater than the activation energy of the reaction. (3)The energy

above which all the colliding molecules will react. (4)The energy below which colliding molecules will not react.

A. the total energy of the reacting molecules at a temperature

B. the tion of molecules with energy greater than the activation energy of the reaction

C. the energy above which all the colliding molecules will react

D. the energy below which colliding molecules will not react

Answer: C

Watch Video Solution

159. $\frac{1}{[\dot{A}]}$ vs time is a straight line. The order of the reaction is

A. 1

B. 2

C. 3

D. 0

Answer: B

Watch Video Solution

160. For the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, how are the rate of reaction expressions $-d\frac{H_2}{dt}$ and $d\frac{NH_3}{dt}$ interrelated?

A. text$(a)(d)\left[(NH)_3 right]\right)(dt) = \left(- (d) \leq ft\left[(H)_2 right]\right)(dt)$

B. `(d)left[(NH)_(3)right](dt)=-(1)(3) (d)left[(H)_(2)right](dt)

C. `(d)left[(NH)_(3)right])(dt)=(2)(3) (d)left[(H)_(2)right])(dt)

D. `(d)left[(NH)_(3)right](dt)=(-3)(2) (d)left[(H)_(2)right])((dt)

Answer: C

Watch Video Solution

161. For a chemical reaction $xA \rightarrow yM$ the rate law is $r = k[A]^3$. If the concentration of (A) is 'doubled the reaction rate will be

A. doubled

B. quadrupled

C. increases by 8 times

D. unchanged

Answer: C

Watch Video Solution

162. The following mechanism has been proposed for the reaction of (NO) with $(Br)_2$ to form $NOBr$. $(NO)(g) + (Br)_2(g) \leftrightarrow (NOBr)_2(g)$. $NOBr2(g) + NO(g) = 2NOBr(g)$

.

$Ifthe2ndstepistherate\det er\min \in gstep, the\ \text{or}\ derofthereactionwith$

(NO)(g)` is

A. 3

B. 2

C. 1

D. 0

Answer: B

Watch Video Solution

163. Which of the following process does not involve a catalyst?

A. Haber process

B. Thermite process

C. Ostwald process

D. Contact process

Answer: B

Watch Video Solution

164. A catalyst increases the rate of reaction because it : increases the activation energy, decreases the energy barrier for reaction, decreases the collision diameter, increases the temperature coefficient

A. increases the activation energy

B. decreases the energy barrier for reaction

C. decreases the collision diameter

D. increases the temperature coefficient

Answer: B

Watch Video Solution

165. A catalyst is used : only for increasing the velocity of the reaction, for altering the velocity of the reaction, only for decreasing the velocity of the reaction, all (a), (b) and (c) are correct

A. only for increasing the velocity of the reaction

B. for altering the velocity of the reaction

C. only for decreasing the velocity of the reaction

D. all (a), (b) and (c) are correct

Answer: B

Watch Video Solution

166. Which of the following statements regarding catalyst is not true? A catalyst remains unchanged in composition and quantity at the end of the reaction, A catalyst can initiate a reaction, A catalyst does not alter the equilibrium in a reversible reaction, Catalysts are sometimes very specific in respect of reaction

A. A catalyst remains unchanged in composition and quantity at the end of the reaction

B. A catalyst can initiate a reaction

C. A catalyst does not alter the equilibrium in a reversible reaction

D. Catalysts are some xx very specific in respect of reaction

Answer: B

Watch Video Solution

167. According to absorption theory of catalysis, the speed of the reaction increases because

A. The concentration of reactant molecules at the active centres of the catalyst becomes high due to absorption

B. in the process of absorption the activation energy of the molecules become large

C. absorption produces heat which increases the speed of the reaction

D. all of the above

Answer: A

Watch Video Solution

168. Enzymes are

A. substances made by chemists to activate washing powder

B. very active vegetable catalysts

C. catalysts formed in organisms

D. synthetic catalysts

Answer: C

Watch Video Solution

169. Enzymes are

A. microorganisms

B. proteins

C. inorganic compounds

D. moulds

Answer: B

Watch Video Solution

170. The enzyme which catalyse the conversion of glucose to ethanol is

A. zymase

B. invertase

C. maltase

D. diastase

Answer: A

Watch Video Solution

171. Half change time for a 1st order reaction is 20 minutes, hence the rate constant for the reaction is

A. 0.346 (min)^(-1)

B. 0.0346 (min)^(-1)

C. 3.46 (min)^(-1)

D. 0.693 (min)^(-1)

Answer: B

Watch Video Solution