

Model Question Paper
Chemical Kinetics II - Part I

12th Standard

Chemistry

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 70

5 x 1 = 5

Part-A

- 1) Hydrolysis of an ester by dilute HCl is an example for
(a) second order reaction (b) zero order reaction (c) pseudo first order reaction (d) first order reaction
- 2) The unit of zero order rate constant is
(a) litre $\text{mol}^{-1} \text{sec}^{-1}$ (b) mol litre $^{-1} \text{sec}^{-1}$ (c) sec^{-1} (d) litre $^2 \text{sec}^{-1}$
- 3) The excess energy which a molecule must possess to become active is known as
(a) kinetic energy (b) threshold energy (c) potential energy (d) activation energy
- 4) Arrhenius equation is
(a) $k = Ae^{-1/RT}$ (b) $k = Ae^{-RT/Ea}$ (c) $k = Ae^{-Ea/RT}$ (d) $k = Ae^{Ea/RT}$
- 5) The term A in Arrhenius equation is called as
(a) Probability factor (b) Activation of energy (c) Collision factor (d) Frequency factor

Part-B

- 6) Define order of a reaction
- 7) Derive the relationship between half-life period and rate constant for a first order reaction
- 8) What is activation energy?
- 9) What is meant by zero order reaction? What is the rate constant of such a reaction?
- 10) Write the Arrhenius equation and explain the terms.

5 x 3 = 15

Part-C

- 11) From the following data on N_2O_5 decomposition in CCl_4 , at 298 K, show that the reaction is first order. Also evaluate the rate constant of the reaction.

6 x 5 = 30

Time(min)	10	15	20	∞
Vol. of O_2 (cc)	6.3	8.95	11.4	34.75

- 12) From the following data, show that decomposition of H_2O_2 in aqueous solution follows a first order reaction. What is the value of the rate constant?

Time(min)	0	10	20	30	40
Volume of KMnO_4 (cc)	25	20	15.6	12.7	9.4

- 13) Compound A reacts by first order kinetics. At 25°C, the rate constant of the reaction is 0.45 sec^{-1} . What is the half life of A at 25°C. What is the time required to have 12.5% unreacted A for first order reaction,
- 14) Explain the experimental determination of rate constant of acid hydrolysis of methyl acetate.
- 15) Write an account of the Arrhenius equation for rates of chemical reactions.
- 16) Write notes on (i) consecutive reactions, (ii) parallel reactions and (iii) opposing reactions

2X10=20

Part-D

- 17) a) Show that for a first order reaction time required for 99% completion is twice the time required for 90% completion of the reaction.
b) In the thermal decomposition of N_2O at 764°C, the time required to decompose half the reactant was 263 seconds, when the initial pressure was 290 mm of Hg and 212 seconds at an initial pressure of 360 mm of Hg. What is the order of this reaction ?
- 18) a) State the characteristics of order of reactions.
b) Explain the experimental determination of rate constant for decomposition of H_2O_2 in aqueous solution.
