Model Question Paper

Chemical Kinetics II - Part I

12th Standard

Chemistry

Reg.No. :

I.Answer all the questions.
II.Use blue pen only.
III.Question number 19 is compulsory.

Time : 01:30:00 Hrs

Total Marks : 75

Part-A

5 x 1 = 5

1) When the value of energy of activation increases, the rate of the reaction

(a) decreases   (b) increases   (c) does not change   (d) becomes zero

2) The rate constant for a first reaction is $1.54 \times 10^{-3} sec^{-1}$. Its half life period is

(a) 540 seconds   (b) 450 seconds   (c) 45 seconds   (d) 54 seconds

3) The half – life period of a first order reaction is 100 minutes

(a) $6.93 \times 10^3 min^{-1}$ (b) $0.693 \times 10^{-3} min^{-1}$ (c) $6.93 \times 10^{-3} min^{-1}$ (d) $69.3 \times 10^{-2} min^{-1}$

4) For the first order reaction $t_{1/2} \propto$

(a) $\frac{1}{a}$ (b) $\frac{1}{a^2}$ (c) constant   (d) a

5) The relationship between half - life period $(t_{1/2})$ and first order rate constant is

(a) $t_{1/2} = 0.693k$ (b) $t_{1/2} = \frac{0.963}{k}$ (c) $t_{1/2} = \frac{0.693}{k}$ (d) $t_{1/2} = \frac{k}{0.693}$

Part-B

5 x 3 = 15

6) Define half life period.

7) Give examples for first order reaction.

8) What are simple and complex reactions?

9) Give example for opposing reactions.

10) Give three examples for opposing reactions.

Part-C

7 x 5 = 35

11) Show that for a first order reaction the time required for 99.9% completion is about 10 times its half life period.

12) Show that for a first order reaction, the time required for 99.9% completion of the reaction is 10 times that required for 50% completion.

13) The rate constant for a first order reaction is $1.54 \times 10^{-3} sec^{-1}$. Calculate its half-life period.

14) A certain amount of methyl acetate was hydrolysed in the

presence of excess of 0.05 M HCl at 25°C. 20 mL of reaction mixture were removed and titrated with NaOH solution, the volume V of alkali required for neutralisation after time 't'

were as follows :

t(min)	0	20	40	60	∞
V (mL)	20.2	25.6	29.5	32.8	50.4

Show that the reaction is the first order reaction.

15) The following values for the first order rate constant were obtained for a certain reaction :

NO.	Temp (°C)	k X 10–5 sec–1
1	25	3.46
2	35	13.50

Calculate the Arrhenius frequency factor and activation energy E_a.

16) The activation energy of a certain reaction is 100 KJ/mole

what is the change in the rate constant of the reaction if the temperature is changed from 25°C to 35°C ? Let the rate constants at 25°C be k_1 and at 35°C be k_2 respectively.

17) 50% of a first order reaction is completed in 20minutes. Calculate the time required to complete 90% of the reaction.

Part-D

2X10=20

18) a)   If the concentration of A and B are expressed in mol dm^{-3} and the time in minutes.Find out the units for the rate and rate constant of the reaction A+B $\longrightarrow$ C+D if it is a zero order reaction.

b)   The half life period of a first order reaction in 20min. Calculate the rate constant.

19) a) a)   Explain the experimental determination of rate constant for the decomposition of nitrogen pentoxide

b)   State the differences between simple and complex reactions

(OR)

b) a)   75% of a first order reaction was completed in 48minutes. When was it half completed?

b)   The reaction 2A+3B $\longrightarrow$ 2C has the rate law, rate=$k[A]^{3/2}[B]^{1/2}$. What is the order o the raction?

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