INDIAN SCHOOL MUSCAT
SENIOR SECTION
DEPARTMENT OF CHEMISTRY
CLASS XII
CHAPTER – CHEMICAL KINETICS
WORKSHEET - 11

1. Why does the rate of a reaction not remain constant throughout the reaction process?

2. The rate of a reaction is 1.2×10^{-3} L/mol/s. What is the order of the reaction?

3. Define the following terms :
   a) Half-life of a reaction (t½)
   b) Rate constant (k)

4. A first order decomposition reaction takes 40 minutes for 30% decomposition. Calculate its $t_{1/2}$ value.

5. Show that for a first order reaction, the time required for half the change is independent of initial concentration.

6. A reaction is first order in A and second order in B.
   a) Write differential rate equation.
   b) How is the rate affected when the concentration of A is tripled?
   c) How is the rate affected when the concentration of both A and B are doubled?

7. An artifact containing wood has only 80% of the C^{14} activity found in a living tree. Estimate the age of the artifact if $t_{1/2}$ of C^{14} is 5730 years.

8. 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 4×10^{10}/s, calculate k at 318K and E_a

9. (a) For a reaction A + B → P, the rate is given by
   Rate = $k[A]^2[B]$
   (i) How is the rate of reaction affected if the concentration of A is doubled?
   (ii) What is the overall order of reaction if B is present in large excess?

   (b) A first order reaction takes 23.1 minutes for 50% completion. Calculate the time required for 75% completion of this reaction.
   (Given : log 2 = 0.301, log 3 = 0.4771, log 4 = 0.6021)

10. a) Explain the following terms:

i) Order of reaction

ii) Molecularity of a reaction

b) The rate of a reaction increases four times when the temperature changes from 300K to 320K. Calculate the energy of activation of the reaction assuming that it does not change with temperature. ($R = 8.314\ J\ K^{-1}\ mol^{-1}$)

11. 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.

12. The following results have been obtained during the kinetic studies of the reaction: $2A + B \rightarrow C + D$

Experiment	[A]/M	[B]/M	Initial rate of formation of D/mol L^{-1} min^{-1}
I	0.1	0.1	6×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.4×10^{-2}

Determine the rate law and rate constant for the reaction.

13. For the decomposition of azoisopropane into hexane and nitrogen at 543K , the following data were obtained. Calculate the rate constant.

T(sec	P (mm of Hg)
0	35
360	54
720	63

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