

ARMY PUBLIC SCHOOL JANGLOT
WORKSHEET OF CHEMICAL KINETICS(M.M=20)

1. What is the rate law for acid hydrolysis of an ester such as $\text{CH}_3\text{COOC}_2\text{H}_5$ in aqueous solution?
 a) $k [\text{CH}_3\text{COOC}_2\text{H}_5]$ (1)
 b) $k [\text{CH}_3\text{COOC}_2\text{H}_5] [\text{H}_2\text{O}]$
 c) $k [\text{CH}_3\text{COOC}_2\text{H}_5]^2$
 d) k
2. How many times will the rate of the elementary reaction $3\text{X} + \text{Y} \rightarrow \text{X}_2\text{Y}$ change if the concentration of the substance X is doubled and that of Y is halved?
 a) $r_2 = 4.5r_1$ (1)
 b) $r_2 = 5r_1$
 c) $r_2 = 2r_1$
 d) $r_2 = 4r_1$
3. Assertion : The decomposition of gaseous ammonia on a hot platinum surface is a zero order reaction at high pressure. (1)
 For a zero order reaction the rate of reaction is independent of initial concentration.
4. Assertion (A) : Rate of reaction normally increases by a factor of 2 to 3 for every 10° rise in temperature.
 Reason (R) : Increase of temperature increases the number of collisions. (1)
5. Derive an integrated rate law expression for first order reaction. (2)
6. How will you differentiate order of reaction and molecularity of reaction? (2)
7. A first order reaction is 20% complete in 20 minutes. Calculate the time taken for the reaction to go to 80% completion. (2)
8. The rate constant for a zero order reaction is $0.0030 \text{ mol l}^{-1} \text{ s}^{-1}$. How long will it take for the initial concentration of the reactant to fall from 0.10M to 0.075M? (2)
9. For the reaction $2\text{NO(g)} + \text{Cl}_2\text{(g)} \rightarrow 2\text{NOCl(g)}$ the following data were collected.
 All the measurements were taken at 263K : (3)

Experiment No.	Initial [NO] (M)	Initial [Cl_2] (M)	Initial rate of disappearance of Cl_2 (M/min)
1	0.15	0.15	0.60
2	0.15	0.30	1.20
3	0.30	0.15	2.40
4	0.25	0.25	?

- (a) Write the expression for rate law.
- (b) Calculate the value of rate constant and specify its units.
- (c) What is the initial rate of disappearance of Cl_2 in exp. 4 ?