

1. (d) $k = \frac{2.303}{t} \log \frac{a}{a-x} = \frac{2.303}{24} \log \frac{1}{\frac{1}{8}} = \frac{2.303}{24} \log 8$

2. (b) Since doubling the concentration of *B* does not change half life, the reaction is of 1st order w.r.t. *B*.
 Order of reaction with respect to *A* = 1 because rate of reaction doubles when concentration of *A* is doubled keeping concentration of *B* constant.
 \therefore Order of reaction = 1 + 1 = 2 and units of second order reaction are $\text{L mol}^{-1} \text{sec}^{-1}$.

3. (d) The molecularity of a reaction is the number of reactant molecules taking part in a single step of the reaction. Thus the reaction involving two different reactant can never be unimolecular.

4. (a) Let the rate law be $r = k[A]^x[B]^y$

Divide (3) by (1) $\frac{0.10}{0.10} = \frac{[0.024]^x [0.035]^y}{[0.012]^x [0.035]^y}$

$\therefore 1 = [2]^x, x = 0$

Divide (2) by (3) $\frac{0.80}{0.10} = \frac{[0.024]^x [0.070]^y}{[0.024]^x [0.035]^y}$

$\therefore 8 = (2)^y, y = 3$

Hence rate equation, $R = k[A]^0[B]^3 = k[B]^3$

5. (a) If we write rate of reaction in terms of concentration of NH_3 and H_2 , then

Rate of reaction = $\frac{1}{2} \frac{d[\text{NH}_3]}{dt} = -\frac{1}{3} \frac{d[\text{H}_2]}{dt}$

So, $\frac{d[\text{NH}_3]}{dt} = -\frac{2}{3} \frac{d[\text{H}_2]}{dt}$

6. (a) As doubling the initial conc. doubles the rate of reaction, order = 1