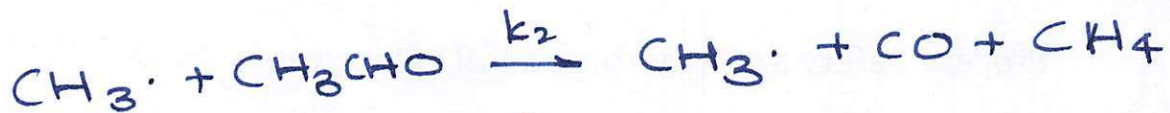


P9-4

①



$$-r_{\text{AC}} = r_1 + r_2 + r_3$$

$$= k_1 C_{\text{AC}} + k_2 C_{\text{AC}} C_{\text{CH}_3\cdot} + k_3 C_{\text{AC}} C_{\text{CHO}\cdot}$$

$$= C_{\text{AC}} [k_1 + k_2 C_{\text{CH}_3\cdot} + k_3 C_{\text{CHO}\cdot}] \quad \text{--- ①}$$

Active intermediate

$\text{CH}_3\cdot, \text{CHO}\cdot$

~~== r~~

$$-r_{\text{CH}_3\cdot} = -r_1 + r_2 - r_3 - r_3 + \frac{1}{2} r_4$$

$$0 = -k_1 C_{\text{AC}} - k_3 C_{\text{CHO}\cdot} C_{\text{AC}} + \frac{1}{2} k_4 C_{\text{CH}_3\cdot}^2 \quad \text{--- ②}$$

$$-r_{\text{CHO}\cdot} = -r_1 + r_3$$

$$0 = -k_1 C_{\text{AC}} + k_3 C_{\text{CHO}\cdot} C_{\text{AC}}$$

$$\Rightarrow C_{\text{CHO}\cdot} = \frac{k_1}{k_3} \quad \text{--- ③}$$

(2)

substituting (3) in (2)

$$0 = -k_1 C_{AC} - k_3 C_{AC} \frac{k_1}{k_3} + \frac{1}{2} k_4 C_{CH_3}^2$$

$$\Rightarrow \frac{1}{2} k_4 C_{CH_3}^2 = C_{AC} [2k_1]$$

$$C_{CH_3} = 2 C_{AC}^{1/2} \left(\frac{k_1}{k_4} \right)^{1/2} \quad \text{--- (4)}$$

substitute (3) and (4) in (1)

$$-r_{AC} = C_{AC} \left[k_1 + 2k_2 \left(\frac{k_1}{k_4} \right)^{1/2} C_{AC}^{1/2} + k_1 \right]$$

$$-r_{AC} = 2k_1 C_{AC} \left[1 + \frac{k_2}{\sqrt{k_1 k_4}} \sqrt{C_{AC}} \right]$$

(b) For

$$-r_{AC} = k C_{CH_3CHO}^{3/2}$$

$$\Rightarrow C_{AC} \gg 1 \quad \text{or}$$

$$\frac{k_2}{\sqrt{k_1 k_4}} \gg 1$$

(c)

