

Answers to Practice Quiz

①

rate of disappearance of A

$$I: \frac{(5\%) 0.1 \text{ mol/L}}{10 \text{ min}} = 0.0005 \frac{\text{mol}}{\text{L min}}$$

I → II increase by 2x

$$II: \frac{(5\%) 0.1 \text{ mol/L}}{5 \text{ min}} = 0.001 \frac{\text{mol}}{\text{L min}}$$

I → III increase by 4x

$$III: \frac{(5\%) 0.2 \text{ mol/L}}{5 \text{ min}} = 0.002 \frac{\text{mol}}{\text{L min}}$$

$$\text{so } v = k [A]^2 [B]^1$$

②

$$K_{100} = x K_0 \Rightarrow A e^{-\frac{11000 J}{8.314 (373)}} = x A e^{-\frac{11000 J}{8.314 (273)}}$$

$$x = \frac{e^{-\frac{11000}{8.314 (373)}}}{e^{-\frac{11000}{8.314 (273)}}} = \frac{2.88 \times 10^{-2}}{7.86 \times 10^{-5}} = 3.67 \text{ times faster}$$

③

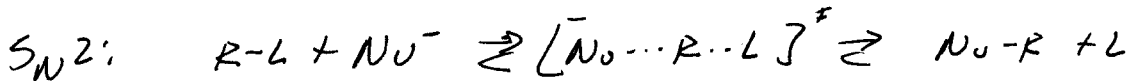
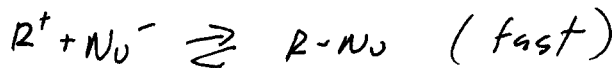
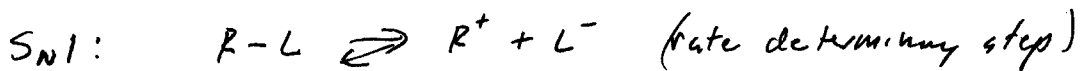
From ACT $k = f K^\ddagger$

$$K^\ddagger = e^{-\frac{\Delta G^\ddagger}{RT}} = e^{-\frac{15000}{8.314 (298)}} = 2.35 \times 10^{-3}$$

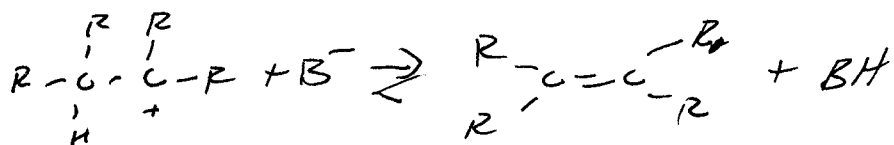
$$f = \frac{k_0 T}{h} = 6.20 \times 10^{12} \frac{1}{s}$$

$$k = f K^\ddagger = (6.20 \times 10^{12}) (2.35 \times 10^{-3}) = 1.46 \times 10^{10} \frac{1}{s}$$

④



E1.



E2

