

Q2

8.1

ES forming rate =

$$V_f = k_1 [E][S]$$

ES reversing rate

$$V_R = k_2 [ES] + k_3 [ES]$$

P forming rate:

$$V_p = k_3 [ES]$$

~~8.2~~8.3 E_0 = total concentration of enzyme

$$k_1 \cdot ([E_0] - [ES]) \cdot [S] = k_2 \cdot [ES] + k_3 \cdot [ES]$$

$$\frac{k_2 + k_3}{k_1} = \frac{([E_0] - [ES]) \cdot [S]}{[ES]}$$

$$\text{Order} = k_m = \frac{k_2 + k_3}{k_1}$$

$$k_m = \frac{([E_0] - [ES]) \cdot [S]}{[ES]}$$

$$[ES] = \frac{[E_0] + [S]}{[S] + k_m}$$

Reaction rates:

$$V = k_3 \cdot [ES]$$

When $V \rightarrow V_{\max}$, which means all the enzyme interact with substrate.

$$V_{\max} = k_3 \cdot [E_0] = k_3 \cdot [ES]$$

$$\frac{V}{k_3} = \frac{V_{\max}}{k_3} \cdot \frac{[S]}{[S] + k_m} \rightarrow V = \frac{V_{\max} \cdot [S]}{[S] + k_m}$$

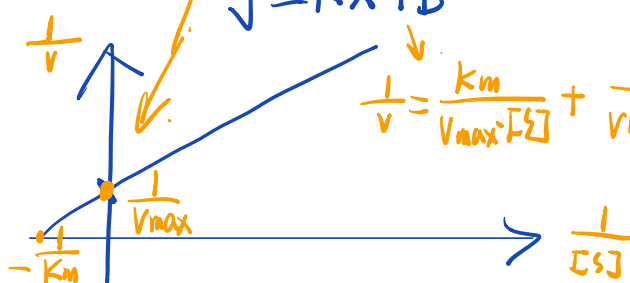
$$\text{taking reciprocal} = \frac{1}{V} = \frac{[S] + k_m}{V_{\max} \cdot [S]} = \frac{1}{V_{\max}} + \frac{k_m}{V_{\max} \cdot [S]}$$

Reciprocal of V_{\max}

Order:

$$y = kx + b$$

$$\frac{1}{V} = \frac{k_m}{V_{\max} \cdot [S]} + \frac{1}{V_{\max}}$$



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