

2.10: Solutions to Selected Problems

Exercise 2.4.1:

- a) non-competitive
- b) competitive
- c) competitive
- d) non-competitive

Exercise 2.5.1:

a) $V_{max} = 1.8 \times 10^{-5} \frac{\text{mol}}{\text{Ls}}$

$$\frac{V_{max}}{2} = 9 \times 10^{-6} \frac{\text{mol}}{\text{Ls}} \text{ so } K_m = 6 \frac{\text{mol}}{\text{L}}$$

b) $V_{max} = 6.5 \times 10^{-7} \frac{\text{mol}}{\text{Ls}}$

$$\frac{V_{max}}{2} = 3.25 \times 10^{-7} \frac{\text{mol}}{\text{Ls}} \text{ so } K_m = 7 \frac{\text{mol}}{\text{L}}$$

c) $V_{max} = 2.6 \times 10^{-5} \frac{\text{mol}}{\text{Ls}}$

$$\frac{V_{max}}{2} = 1.3 \times 10^{-5} \frac{\text{mol}}{\text{Ls}} \text{ so } K_m = 6 \frac{\text{mol}}{\text{L}}$$

d) $V_{max} = 1.2 \times 10^{-5} \frac{\text{mol}}{\text{Ls}}$

$$\frac{V_{max}}{2} = 6 \times 10^{-6} \frac{\text{mol}}{\text{Ls}} \text{ so } K_m = 6 \frac{\text{mol}}{\text{L}}$$

e)

$$V_{max} = 6.0 \times 10^{-7} \frac{\text{mol}}{\text{Ls}}$$

$$\frac{V_{max}}{2} = 3 \times 10^{-7} \frac{\text{mol}}{\text{Ls}} \text{ so } K_m = 13 \frac{\text{mol}}{\text{L}}$$

Exercise 2.5.2:

a) $\frac{1}{V_{max}} = 30 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 3.3 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -40 \frac{\text{L}}{\text{mmol}} \text{ so } K_m = 2.5 \times 10^{-2} \frac{\text{M}}{\text{L}}$$

b) $\frac{1}{V_{max}} = 50 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 2.0 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -70 \frac{\text{L}}{\text{mmol}} \text{ so } K_m = 1.4 \times 10^{-2} \frac{\text{M}}{\text{L}}$$

c) $\frac{1}{V_{max}} = 60 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 1.7 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -70 \frac{\text{L}}{\text{mmol}} \text{ so } K_m = 1.4 \times 10^{-2} \frac{\text{M}}{\text{L}}$$

d) $\frac{1}{V_{max}} = 50 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 2.0 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -100 \frac{\text{L}}{\text{mmol}} \text{ so } K_m = 1.0 \times 10^{-2} \frac{\text{M}}{\text{L}}$$

e) $\frac{1}{V_{max}} = 30 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 3.3 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -100 \frac{\text{L}}{\text{mmol}} \text{ so } K_m = 1.0 \times 10^{-2} \frac{\text{M}}{\text{L}}$$

a) $\frac{1}{V_{max}} = 30 \frac{\text{Ls}}{\text{mol}} \text{ so } V_{max} = 3.3 \times 10^{-2} \frac{\text{mol}}{\text{Ls}}$

$$\frac{-1}{K_m} = -60 \frac{L}{\text{mmol}} \text{ so } K_m = 1.7 \times 10^{-2} \frac{M}{L}$$

Exercise 2.5.3:

- a. uncompetitive
- b. mixed
- c. noncompetitive
- d. competitive
- e. uncompetitive
- f. noncompetitive
- g. competitive

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