

**BIO 5099**  
**Homework Assignment #6**

Name \_\_\_\_\_

Due start of class, **Tuesday October 1<sup>st</sup>**.

Late assignments are not accepted, show your work for partial credit.

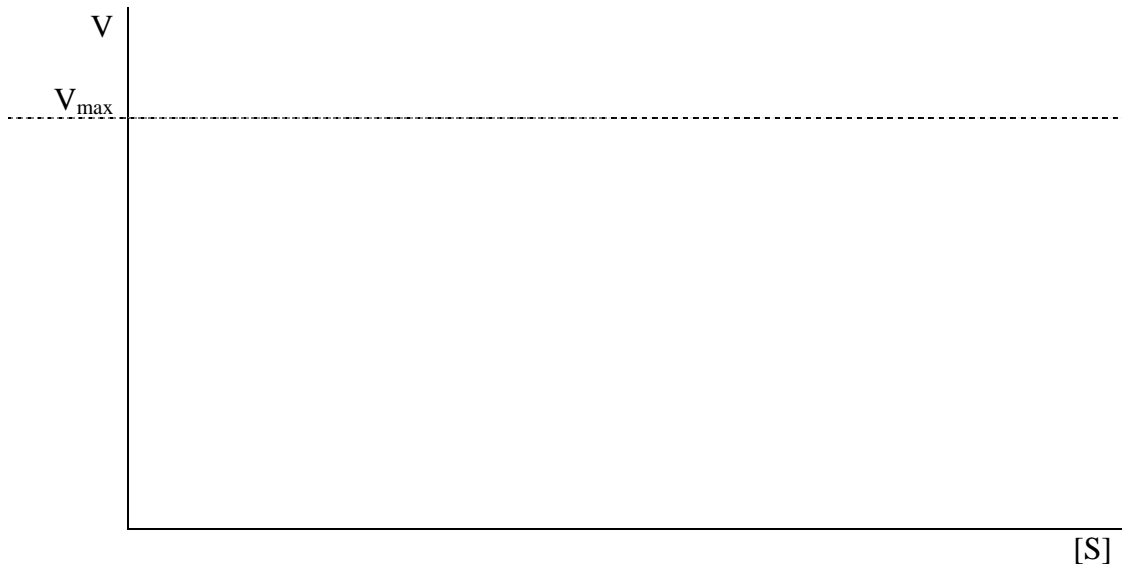
Assignments may be e-mailed to: christiaan@xiaan.com or rbaror@dmibio.com anytime, or faxed to (303) 556-2889 between 3:00 and 4:00 p.m. on Tuesday.

Define **in your own words** and give an example:

1. (2pts)      Hydrolysis
  
  
  
  
  
  
  
  
  
  
2. (2pts)      Substrate Affinity
  
  
  
  
  
  
  
  
  
  
3. (2pts)      Isoelectric Point
  
  
  
  
  
  
  
  
  
  
4. (2pts)      Antibody
  
  
  
  
  
  
  
  
  
  
5. (2pts)      How does a ribosome know where to start translation? Where to stop translation?
  
  
  
  
  
  
  
  
  
  
6. (2pts)      Which is more efficient: aerobic metabolism or anaerobic metabolism? Why?

7. (8pts) Vitamin C deficiency is a contributing factor for scurvy.
- a) What enzyme is affected by the Vitamin C deficiency?
  - b) What is this enzyme's EC Number? What are the two top level EC classifications for this enzyme?
  - b) How does Vitamin C interact with this enzyme?
  - c) What does this mean for collagen produced as a result of a diet deficient in Vitamin C?
8. (2pts) For Michaelis-Menten Kinetics, what are the assumptions of the steady-state approximation? What does this mean for [E] vs. [S]?
9. (2pts) How do we measure an enzyme's affinity for substrate? If an enzyme has a  $K_m$  of 14.5, what is its affinity?

10. (2pts) In the space below, draw the reaction curve for a typical enzyme, plotting [S] versus the reaction velocity. In the same space, show how this curve would be affected in the presence of a *competitive inhibitor* to this enzyme.



11. (2pts) Describe two differences between light and electron microscopy.

**You are a scientist in a large laboratory with every imaginable instrument at your disposal – you even know how to use them all! You have been assigned to characterize an unknown sample of either DNA or protein, handed to you in a small vial.**

12. (5pts) Describe what instruments/techniques you would use to determine whether the sample contains DNA or protein (consulting other scientists doesn't count).

13. (4pts) Assume the sample contains protein. What instruments/techniques would you use to characterize/identify it?

14. (3pts) Assume the sample contains DNA. What instruments/techniques would you use to characterize/identify it?