Chemistry 24b (Spring term 2004)
Problem Set #5
Due: 5/17/04, 11AM, in class

Part I

From Tinoco, Sauer, Wang and Puglisi: Chapter 8, Problems 17, 22, 26, 27, 28

Part II

The following table indicates the rates at which a substrate reacts as catalyzed by an enzyme that follows the Michaelis-Menten mechanism: (1) in the absence of inhibitor; (2) and (3) in the presence of 10 mM concentration, respectively, of each of two inhibitors. Assume $[E]_T$ is the same for all reactions.

[S] (mM)	(1) v_0 (μM/s)	(2) v_0 (μM/s)	(3) v_0 (μM/s)
1	2.5	1.17	0.77
2	4.0	2.10	1.25
5	6.3	4.00	2.00
10	7.6	5.70	2.50
20	9.0	7.20	2.86

(a) Determine K_M and V_{max} for the enzyme. For each inhibitor determine the type of inhibition and K_I and/or $K_{I'}$. What additional information would be required to calculate the turnover number of the enzyme?
(b) For [S]= 5 mM, what fraction of the enzyme molecules have a bound substrate in the absence of inhibitor, in the presence of 10 mM inhibitor of type (2), and in the presence of 10 mM inhibitor of type (3) ?