QUESTION 1

In an attempt to control the zebra mussel, several compounds have been tried as potential inhibitors of a key enzyme in NTP growth. Below are the v vs. [S] data for these inhibitors. Based on these data, determine (i) K_I for each of inhibitors (UNITS PLEASE!) and (ii) the type of inhibitor each of them is.

[S]	No Inh	[Inh A] 6 uM	[Inh B] 4 mM
0.2	16.7	6.25	10
0.25	20	7.7	11.1
0.33	25	10	12.5
0.5	33.3	14.3	14.3
1	50	25	16.7
2	66.7	40	18.2
2.5	71.4	45.5	18.5
3.33	76.9	52.6	18.9
4	80	57.1	19
5	83.3	62.5	19.2

QUESTION 2

The enzyme laccase catalyzes the reduction of oxygen to water.

$$4 e^{-} + O_2 \rightarrow 2 H_2O$$

Even though this is a bi-substrate reaction, the velocity of binding oxygen can be ignored and thus the kinetic mechanism can be dealt with as:

$$\begin{array}{ccc}
k_1 & k_3 \\
E + S \Leftrightarrow ES \rightarrow E + P \\
k_2
\end{array}$$

Just like cytochrome oxidase, laccase is inhibited by the addition of azide (N_3^-) . Below is given the kinetic data for the inhibition of oxygen reduction by N_3^- . A) Please analyze this data and enumerate K_m , V_{max} for the reaction and K_1 for N_3^- inhibition. B) What kind of inhibitor is N_3^- ?

In evaluating K_I and the type of inhibition (Hint: be sure to determine K_I in two ways), please show the kinetic mechanism and show the velocity equation for the scheme. Be sure to justify your answers using velocity equations and/or its derivatives. For complete credit, show ALL work and include ALL plots/replots.

[S] (M)	[N3]=0	[N3]=6 μM	[N3]=30 μM	[N3]=60 μM	[N3]=150 μM
1.50E-04	5.26	4.96	3.66	2.81	1.76
2.00E-04	6.81	6.39	4.75	3.65	2.27
4.50E-04	13.40	12.37	9.44	7.29	4.37
9.00E-04	21.85	19.76	15.61	12.09	6.97
1.40E-03	28.20	25.12	20.36	15.82	8.84