

Answers.

3. Recall the Randles-Sevcik equation: $i_p = (2.69 \times 10^5) n^{3/2} A D_o^{1/2} \nu^{1/2} C_o^*$

Be sure to be careful with your units!

Then, $i_p(Tl^+)/i_p(Cu^{2+}) = 1 = 1^{3/2} (2 \times 10^{-5})^{1/2} 1^{1/2} 3 / (2^{3/2} (0.72 \times 10^{-5})^{1/2} \nu^{1/2} 0.1)$

1] Solving, $\nu = 312.5 \text{ V/s}$

2] Yes $0.0565/\nu = \Delta E_p$

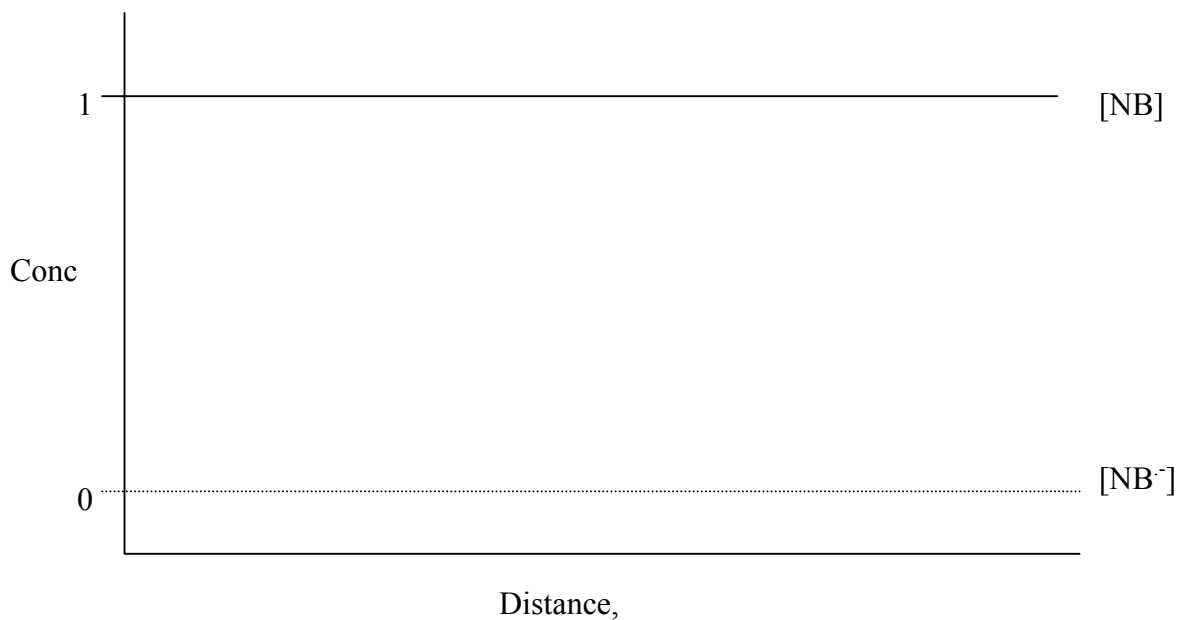
Also use $i_p = 2.69 \times 10^5 n^{3/2} A C_{ox}^b D_{ox}^{1/2} \nu^{1/2}$

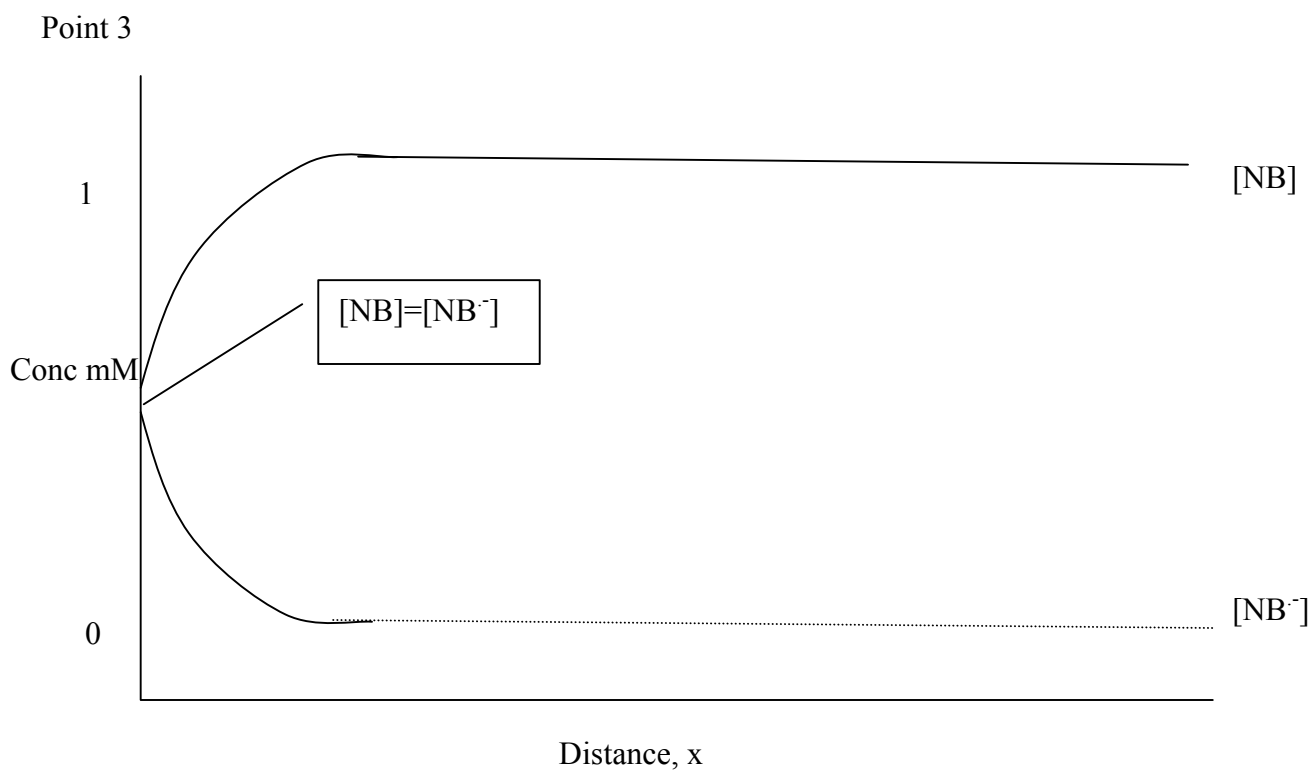
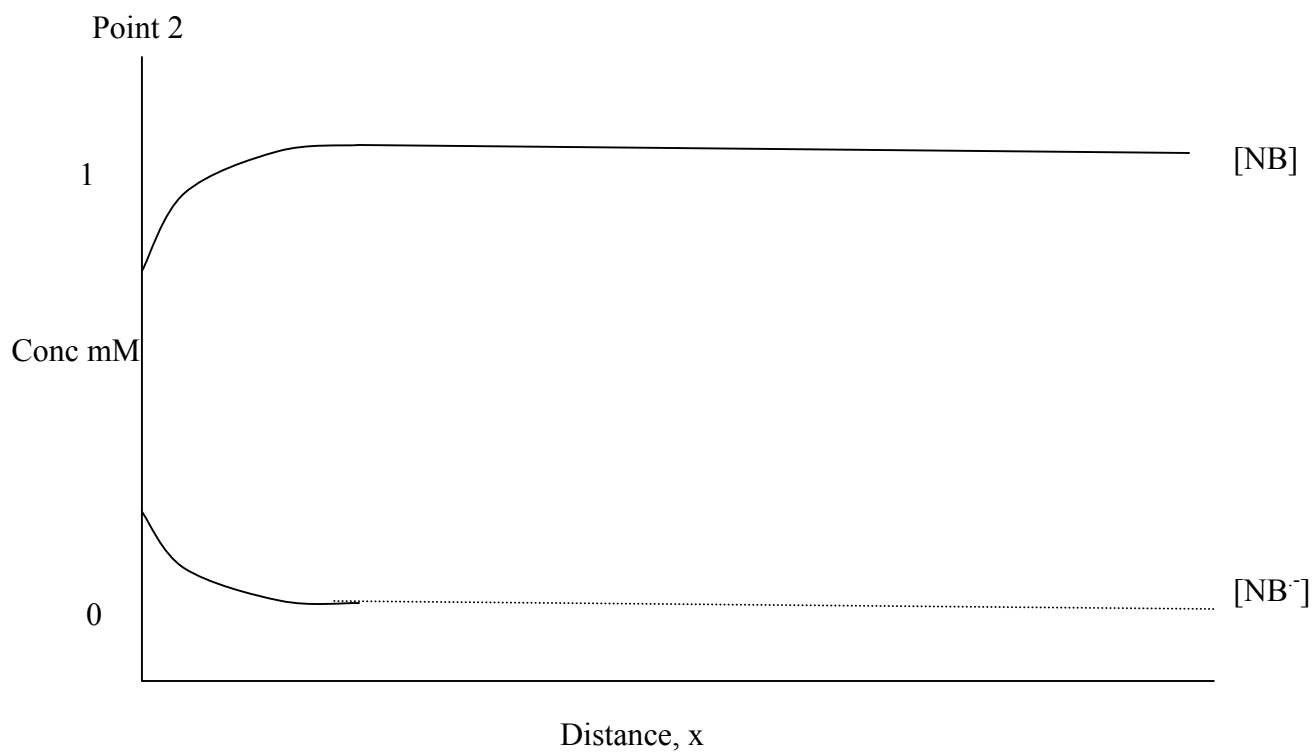
$i_p/\nu^{1/2}$ should be constant with each scan rate.

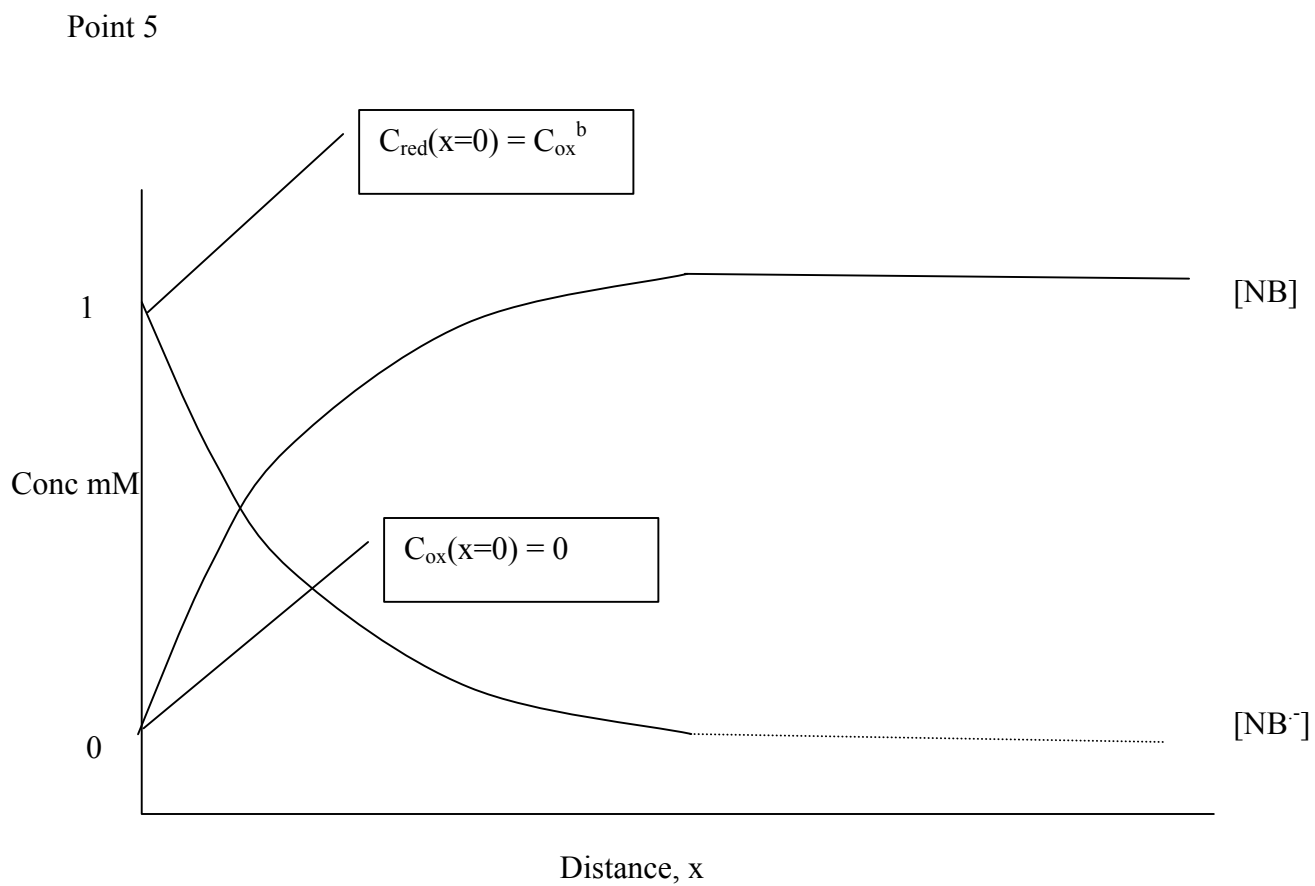
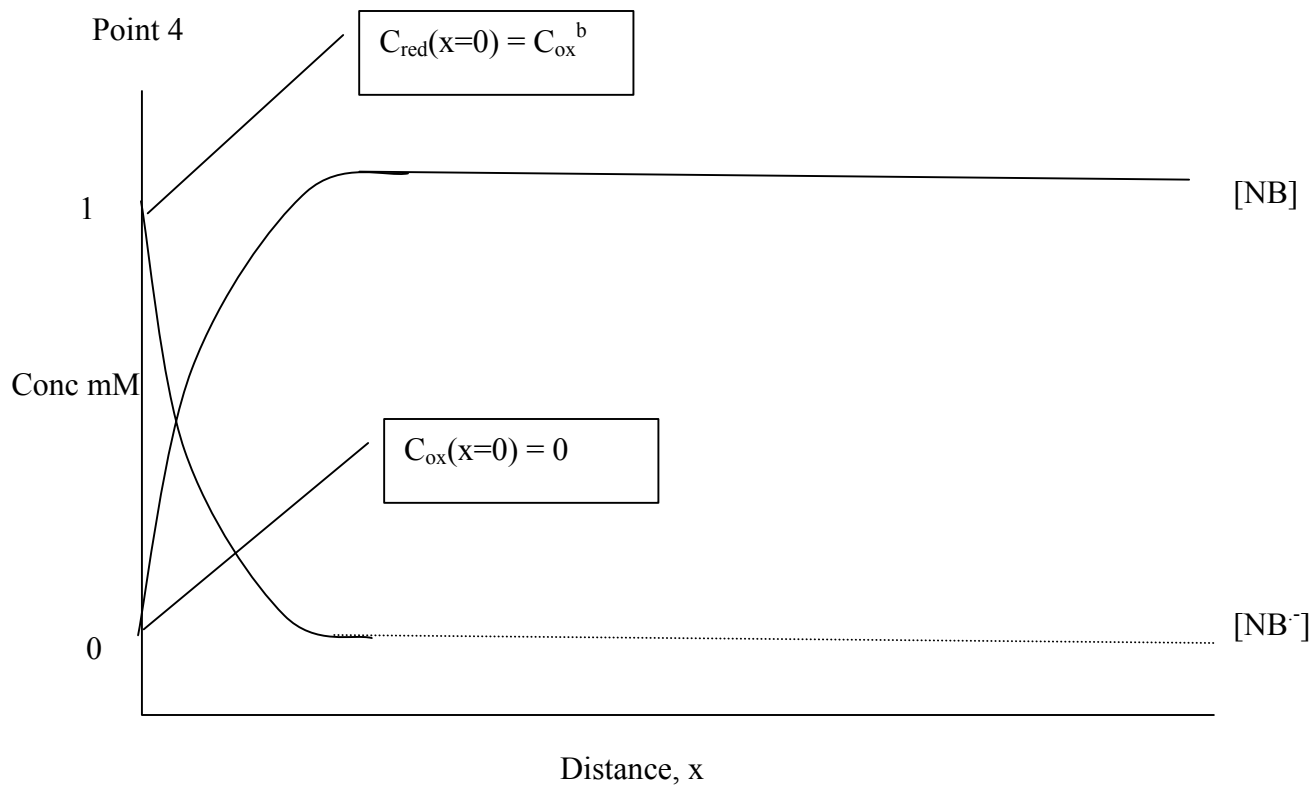
Also i_{pa}/i_{pc} should be 1, an indication that not chemical reactions are coupled with the E step.

ν , mV/s	ΔE_p	i_{pa}/i_{pc}	$i_{pa}/\nu^{1/2}$	$i_{pc}/\nu^{1/2}$
16.7	57	1.02	75.8	74.3
33.3	59	1.02	76.7	75.1
50.0	58	1.01	76.5	75.6
	approx. 56.5 mV	approx. 1	= constant	= constant

3] point 1

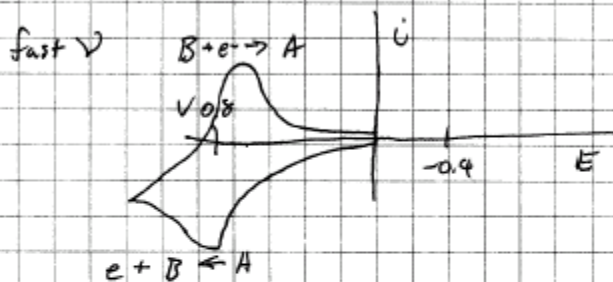




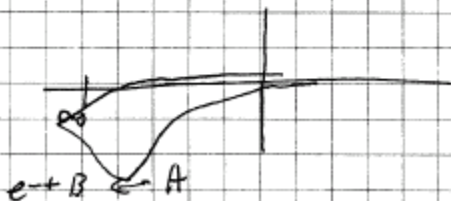


4]

at fast ν only electrochemical reaction will be observed. Chemical reaction will be slow,



at slow ν B reacts to form another chemical compound. Therefore no reduction observed



5]

time-window $\frac{RT}{Fv} = \frac{0.0267}{v}$

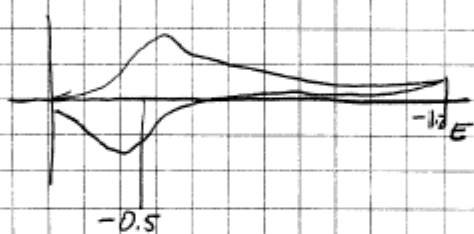
$\frac{50 \text{ mV}}{s}$ $t = 0.53 \text{ sec}$

$1 \frac{V}{s}$ $t = 0.0267 \text{ sec}$

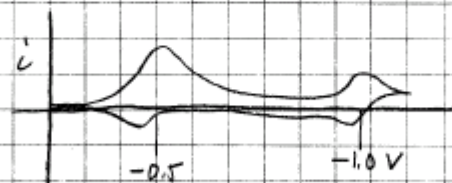
$20 \frac{V}{s}$ $t = 0.0013 \text{ sec}$

at $20 \frac{V}{s}$ Very little of $B \rightarrow C$ is apparent
 $t_{1/2} = 100 \text{ ms}$ or 0.100

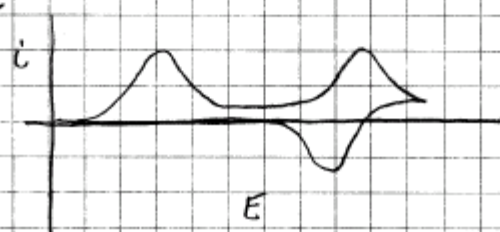
Therefore



at $1 \frac{V}{s}$ some of $B \rightarrow C$ will occur therefore:



at $50 \frac{mV}{s}$



6] From i_{pa}/i_{pc} we can see that at slow scan rates the red form is gone. Therefore

ox + e- = red

red → product

This is an EC mechanism, see section 12.3.3