1a Well... the Nernst Eqn relates ion conc. to the potential difference required to put system in equilibrium...

$$\underset{\substack{\uparrow \\ \text{got this}}}{E_m} = 0.058 \log \underbrace{\frac{[\text{ion}]}{[\text{ion}]}}_{\text{want this}} \quad (\text{in volts})$$

$$120 = 58 \log X \quad (\text{in mV})$$

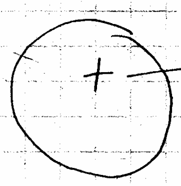
$$\frac{120}{60} \approx \log X$$

$$2 = \log X$$

$$10^2 = X$$

⤷ 100 : 1 <u>ratio</u>!

1b A cation, so (+) charge. I am prevented efflux ~~this~~ of a + ion.



→ wants to go out due to conc. gradient. The voltage gradient <u>prevents</u> efflux.

so → must be negative inside

2. We know what happens to a cell when gK and gNa both increase → This is the case at the post-synaptic membrane at the n.m.j.

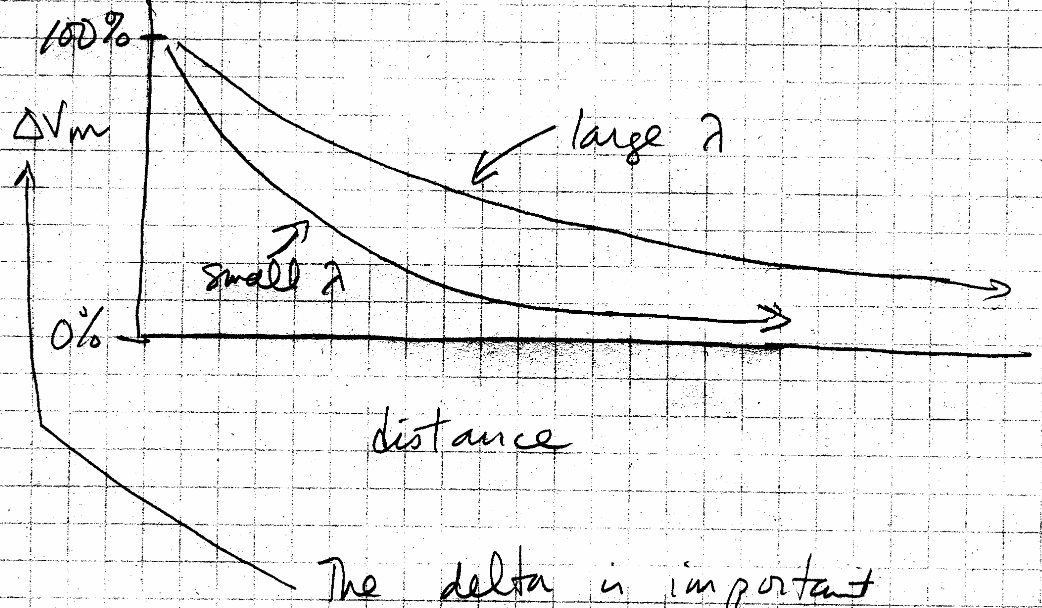
since the conc. driving forces are approximately equal and opposite -

$$\left.\begin{array}{l} K \xrightarrow{\text{out}} \\ \xleftarrow{\text{in}} Na \end{array}\right\} \begin{array}{l}\text{effects cancel} \\ \text{and } V_M \rightarrow 0\,mV\ (+,\end{array}$$

3. Rule #1 → The concentration ratios never change (unless by experimental manipulation)

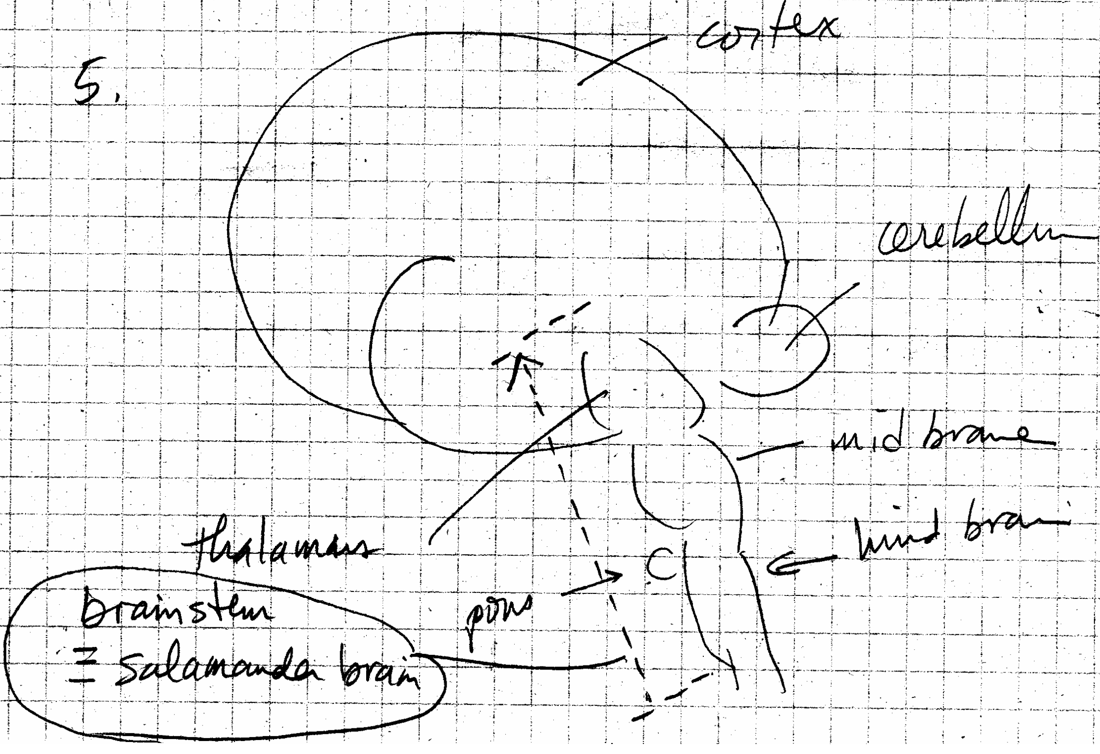
So even after 1000 APs, it is still 20 mM inside, 400mM outside [answer a]

4.



The delta is important

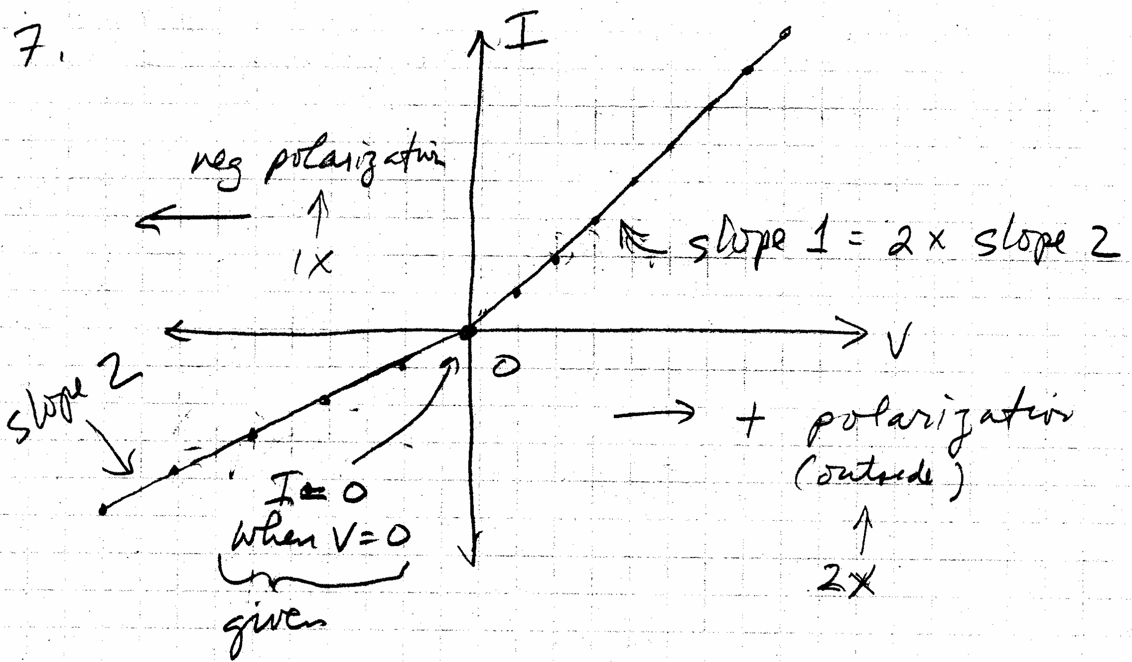
5.



brainstem
≡ salamanda brain

6. OK, so we are going efferent and crossing midline. Of the choices given → only pontine and superior colliculus are efferent relative to the thalamus. Since we start left, the end must be right, so the only good answer is the right pontine (c).

7.

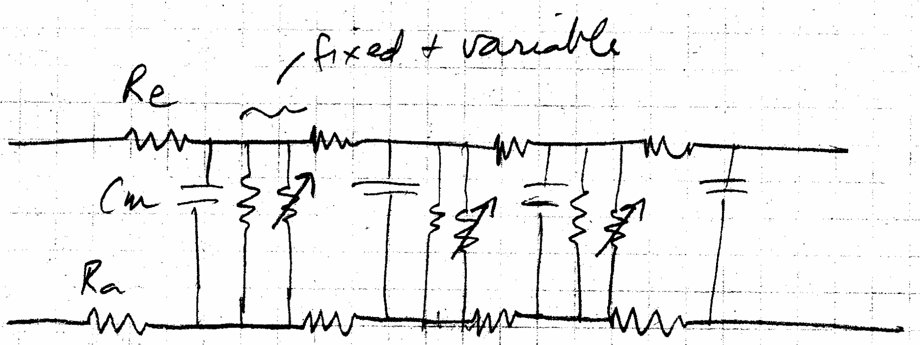


8. Hmm ... vesicles or MT subunit

↖ but not these guys

These guys go by *Fast* xport, so the vesicle wins!

9.



Something like this ↗

Also could do →