Quiz 2.2: Nernst equation

Reversal potential

0 points possible (ungraded)

Using the Nernst equation, $E_{rev} = -\frac{KT}{ze} log\left(\frac{C_{int}}{C_{ext}}\right)$, where $k = 1.4 \times 10^{-23} J/K$ is the Boltzmann constant, $T = 300K$ is the absolute temperature, $e = 1.60 \times 10^{-19} C$ is the electron's charge, and z is the valence of the ion species.

1. Calculate the reversal potential for Na^+, K^+, and Ca^{2+} in mV assuming the following concentrations:

$C_{int}\left[K^+\right] = 140, C_{ext}\left[K^+\right] = 5$

$C_{int}\left[Na^+\right] = 10, C_{ext}\left[Na^+\right] = 145$

$C_{int}\left[Ca^{2+}\right] = 10^{-4}, C_{ext}\left[Ca^{2+}\right] = 1.5$

You should not worry about the exact value of these numbers. Numerical tolerance is considered.

$E_{rev}\left[K^+\right]$=?

-0.08747036839209908 ✖ **Answer:** -83.0

-0.08747036839209908

$E_{rev}\left[Na^+\right]$=?

0.07019640204744637 ✖ **Answer:** +66.0

0.07019640204744637

$E_{rev}\left[Ca^{2+}\right]$=?

0.09598601758056019 ✖ **Answer:** +120.0

0.09598601758056019

Submit You have used 1 of 1 attempt

ℹ Answers are displayed within the problem

Temperature effect

0 points possible (ungraded)

2. What happens to the absolute value of the reversal potential if you change the temperature from 37 to 18.5 degree celsius?

- [ ] does not change
- [ ] increase a little bit
- [x] decrease a little bit
- [ ] increase by factor 2
- [ ] decrease by factor 1/2

✔

Submit You have used 1 of 1 attempt