Surviving the Wreck!

It’s April 14, 1912 and your journey on the unsinkable ship the Titanic is coming to an end. Luckily, you were one of the few souls to gain a seat in a life boat and as you watch the great ship tip up, then break in half and sink you are hit with a feeling of being thirsty. In the rush to get to safety no one thought to pack provisions into the lifeboat. Day after day your little party floats along in the frigid artic air and your thirst begins to feel unquenchable. People are starting panic and experimenting with drinking seawater to quench their thirst. You’re not sure this is a good idea so you decide to solve a couple of water potential problems, while waiting for rescue, to determine if drinking sea water is a good idea or not.

a. The majority of dissolved ions in seawater is NaCl, roughly a 0.5 M NaCl concentration. The ionization constant for NaCl is 2.0. Calculate the solute potential for seawater if you know that the water is -5°C.

b. Your own cells have a 0.15 M NaCl concentration. Calculate the solute potential for your own cells, knowing that body temperature is 37°C.

c. Using the formula for calculating water potential in what direction will water flow if a person drinks the very cold seawater? Explain.

d. Is drinking seawater a good idea for survival? What effect will drinking seawater have on you and your chances of surviving until you are rescued?