1a. Which of the following can be calculated using the Nernst equation?
   a) The resting membrane potential of a cell
   b) The equilibrium potential of an ion across a semi-permeable membrane
   c) The change in membrane potential resulting from a net flow of an ion
   d) All of the above

1b. If the concentration of potassium (K⁺) outside a cell is 30mM and 350mM inside the cell, what will be the equilibrium potential of potassium across the membrane, assuming that it is semi-permeable to potassium?
   a) -68.2 mV
   b) 68.2 mV
   c) -34.1 mV
   d) 34.1 mV

1c. If the concentration of chloride (Cl⁻) outside a cell is 100mM and 4mM inside the cell, what will be the equilibrium potential of chloride across the membrane, assuming that it is semi-permeable to chloride?
   a) -40.5 mV
   b) 40.5 mV
   c) -81.1 mV
   d) 81.1 mV

1d. If the resting membrane potential of a cell is known to be -60mV and the potassium concentrations given in question 1b ([K⁺]₀ = 30mM and [K⁺]ᵢ = 450mM) are introduced to the membrane, in which direction will the potassium ions want to move?
   a) Into the cell
   b) Out of the cell
   c) No net force on the ions
   d) Not enough information to tell
1e. If the resting membrane potential of a cell is known to be 90mV and the chloride concentrations given in question 1c ([Cl]₀ = 100mM and [Cl]ᵢ = 4mM) are introduced to the membrane, in which direction will the chloride ions want to move?

a) Into the cell  
b) Out of the cell  
c) There will be no net force on the ions  
d) Not enough information to tell

1f. At rest most axons are highly permeable to potassium (K⁺) and mostly impermeable to sodium (Na⁺) and have a resting membrane potential of approximately -65mV. If you were to double the external concentration of sodium by adding NaCl to the extracellular fluid, what would be the effect on the resting membrane potential?

a) Resting membrane potential would increase significantly  
b) Resting membrane potential would decrease significantly  
c) Resting membrane potential would stay approximately the same  
d) Not enough information to tell

1g. If you were to double the permeability of an axonal membrane to sodium, what would happen to the equilibrium potential for sodium in the cell?

a) Equilibrium potential of sodium would increase  
b) Equilibrium potential of sodium would decrease  
c) Equilibrium potential of sodium would stay the same  
d) Not enough information to tell