Unit 11 - Week 9

Assignment 9

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-18, 23:59 IST.

1) The species velocity of ions in a system where the ions are under the influence of an electric field is given by *1 point*

- (force on a mole of ions) X (molar mechanical mobility)
- $\frac{force\ on\ a\ mole\ of\ ions}{molar\ mechanical\ mobility}$
- molar mechanical mobility
- force on a mole of ions

No, the answer is incorrect.
Score: 0
Accepted Answers:
(force on a mole of ions) X (molar mechanical mobility)

2) The flux of ions due to electrical driving force is given by *1 point*

- $J_E^* = -cuzF\frac{dV}{dx}$
- $J_E^* = -D\frac{dV}{dx}$
- $J_C^* = -D\frac{dC}{dx}$
- $J_E^* = -cuzF\frac{dC}{dx}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$J_E^* = -cuzF\frac{dV}{dx}$

3) At electro- diffusive equilibrium *1 point*

- The net fluxes of all ions are zero
- The flux due to concentration gradient is zero
- The flux due to electrical driving force is zero
- The spatial distribution of potential is proportional to the logarithm of the solute concentration

No, the answer is incorrect.
Score: 0
Accepted Answers:
The net fluxes of all ions are zero
The spatial distribution of potential is proportional to the logarithm of the solute concentration

4) A certain cell was found to have the following equilibrium concentrations of Na+ when the experiment was conducted at 37 °C: intracellular: 2 mM; extracellular 90 mM. Assuming that the membrane is permeable only to Na+, estimate the equilibrium membrane potential. *1 point*

- 98.9 mV
- 130.8 mV
- 101.6 mV
- 68.3 mV

No, the answer is incorrect.
Score: 0
Accepted Answers:
101.6 mV

5) The membrane potential under Donnan equilibrium is *1 point*

- resting potential
- Nernst potential
- always increasing
- always decreasing

No, the answer is incorrect.
Score: 0
Accepted Answers:
resting potential

6) Identify the equation for resting membrane potential of a neuron considering only the K+ and Na+ fluxes (independent of each other) across the membrane. Given are the conductances (g_K and g_{Na}) and respective Nernst potential (NP) *1 point*

- $\Delta V_{m,r} = \frac{g_K NP_K + g_{Na} NP_{Na}}{g_K + g_{Na}}$
- $\Delta V_{m,r} = \frac{g_{Na} NP_K + g_K NP_{Na}}{g_K + g_{Na}}$
- $\Delta V_{m,r} = g_K NP_K - g_{Na} NP_{Na}$
- $\Delta V_{m,r} = g_{Na} NP_K + g_K NP_{Na}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\Delta V_{m,r} = \frac{g_K NP_K + g_{Na} NP_{Na}}{g_K + g_{Na}}$

7) What happens when Na ions move from the outside to the inside of the cell? *1 point*

- membrane is at resting potential
- membrane remains polarised
- membrane is depolarised
- membrane is repolarised

No, the answer is incorrect.
Score: 0
Accepted Answers:
membrane is depolarised

8) In the process of electrophoresis, the ion flux occurs as a result of *1 point*

- concentration gradient alone
- electrical potential gradient alone
- both concentration gradient and electrical potential gradient
- diffusion alone

No, the answer is incorrect.
Score: 0
Accepted Answers:
both concentration gradient and electrical potential gradient

9) Electrophoretic mobility is defined as *1 point*

- the velocity per unit electric field strength
- the distance travelled per time
- the frictional force of a moving particle
- the force due to electric field on the particle

No, the answer is incorrect.
Score: 0
Accepted Answers:
the velocity per unit electric field strength

10) The electrostatic potential **V** at a distance *d* in a medium of dielectric constant *k* is given as *1 point*

- $V = \frac{ze}{kd}$
- $V = \frac{kd}{ze}$
- $V = k\frac{ze}{d}$
- $V = kd\frac{2}{ze}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$V = \frac{ze}{kd}$