

## Quiz 9.2 – Electrolyte Solutions

Name: Key

## Question 1

Classify each of the following compounds as a *strong* electrolyte, *weak* electrolyte, or *non-electrolyte*

- $\text{Ca}(\text{NO}_3)_2$  *Strong*
- $\text{H}_2\text{CO}_3$  *weak*
- $\text{N}_2$  *non-*
- $\text{NH}_3$  *weak*
- $\text{HNO}_3$  *Strong*
- $\text{C}_6\text{H}_{12}\text{O}_6$  *non-*

## Question 2

Give the molal concentration of solute particles in the following solutions:

- $0.75\text{M MgCl}_2$   $\text{MgCl}_2 \rightarrow \text{Mg}^{2+} + 2\text{Cl}^- \rightarrow 3 \text{ ions}$   $0.75\text{M} \cdot 3 = 2.25\text{m}$
- $0.25\text{M CH}_3\text{CH}_2\text{OH}$  *non-electrolyte*  $\rightarrow 0.25\text{M}$
- A solution with  $0.2\text{M NaCl}$  and  $0.3\text{M CHCl}_3$   
 $\rightarrow 2 \text{ ions} \rightarrow 0.4\text{m} \rightarrow \text{non-electrolyte} \rightarrow 0.3\text{m}$  *together, 0.7m*

## Question 3

Find the freezing point of an aqueous solution with  $1.5\text{M MgSO}_4$ . Water has a freezing point depression constant of  $-1.86^\circ\text{C}/\text{m}$ 

$$\Delta T = -1.86^\circ\text{C}/\text{m} \cdot 3\text{m} = -5.58^\circ\text{C}$$

$\rightarrow 2 \text{ ions} \rightarrow 3\text{m}$

## Question 4

Saline solution commonly used in medical practice is made by dissolving  $9\text{g}$  of  $\text{NaCl}$  in  $1\text{L}$  of solution. Find the osmotic pressure of saline solution (in atm) *at 298 K*

$$\frac{9\text{g NaCl}}{58.44\text{g NaCl}} \cdot \frac{1\text{mol NaCl}}{1\text{NaCl}} \cdot 2 \text{ solute particles} = 0.308 \text{ moles solute particles}$$

$$\pi = \frac{nRT}{V} = \frac{0.308 \text{ moles} \cdot 0.08206 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}} \cdot 298 \text{ K}}{1\text{L}} = 7.5 \text{ atm}$$