EX 1

$MM_X = ?$

18.5 g di X in 825.8 g Benzene

$\Delta T_{cr} = 1.8\ °C$ $\quad K_{cr} = 5.12\ °C\ Kg\ mol^{-1}$

$$m = \frac{mol}{Kg}$$

$$\Delta T = K_{cr} \cdot m \qquad m_{soluto} = \frac{\Delta T_{cr}}{K_{cr}} = \frac{1.8\ °C}{5.12\ °C\ \frac{Kg}{mol}} = 0.35\ \frac{mol}{Kg}$$

$$0.35\ \frac{mol}{Kg} = \frac{\frac{18.5\ g}{MM_X}}{0.8258\ Kg} \longrightarrow \boxed{MM_X = 64.0\ g/mol}$$

Ex 2

$\Pi \cdot V = nRT \Rightarrow \Pi = M \cdot R \cdot T(i)$ → coefficiente di Van't Hoff

$T = 37°C + 273 = 310\,K$

$\Pi = 7.65\,atm$

$C_6H_{12}O_6$ ($MM = 180\,g/mol$) = ?

500 mL isotonico con il sangue

$7.65\,atm = \frac{n_{soluto}}{0.500\,L} \cdot 0.082\,\frac{atm\,L}{mol\,K} \cdot 310\,K$

$n_{soluto} = 0.154\,mol$

$m_{soluto} = m_{C_6H_{12}O_6} = 0.154\,mol \cdot 180\,g/mol = \boxed{27.7\,g}$

EX3

$NaCl \longrightarrow Na^+ + Cl^-$ $\quad i = 2$

$BaCl_2 \longrightarrow Ba^{++} + 2Cl^-$ $\quad i = 3$

$\Pi = ?$

$T = 15°C + 273 = 288\ K$

2L 12g NaCl

15g $BaCl_2$

$$\Pi_{tot} = \Pi_{NaCl} + \Pi_{BaCl_2}$$

$$\Pi_{tot} = M_{NaCl} \cdot R \cdot T \cdot i + M_{BaCl_2} \cdot R \cdot T \cdot i$$

$$M_{NaCl} = \frac{12g / 58.5\,g/mol}{2L} = 0.103\,M$$

$$M_{BaCl_2} = \frac{15g / 208.3\,g/mol}{2L} = 0.0360\,M$$

$$\Pi_{tot} = 0.103 \cdot R \cdot T \cdot 2 + 0.0360 \cdot R \cdot T \cdot 3$$

$$\Pi_{tot} = R \cdot T \left(0.103 \cdot 2 + 0.0360 \cdot 3\right)$$

→

$$\Pi_{tot} = 0.0821 \frac{atm \cdot L}{mol \cdot K} \cdot 288\,K \cdot \left(0.206 \frac{mol}{L} + 0.108 \frac{mol}{L}\right)$$

$$\Pi_{tot} = 7.42\ atm$$

$$p_i = \chi_i \cdot p_{tot}$$

Le proprietà colligative sono ADDITIVE