Answer on Question # 68391, Chemistry / General Chemistry

KI and Sucrose solution with 0.1 M concentration have osmotic pressure of 0.465 atm and 0.245 atm respectively . Find the Van't Hoff factor of KI and it's degree of dissociation.

Solution:

$$\Pi = i \times c \times R \times T$$

1) Find temperature of solution, i for sucrose is 1:

$$T = \frac{P}{c \times R} = \frac{0{,}246 \times 101.325}{0.1 \times 8.31} = 30\ K$$

2) Find the Van't Hoff factor of KI:

$$i = \frac{\Pi}{c \times R \times T} = \frac{0.465 \times 101.325}{0.1 \times 8.31 \times 30} = 1.88$$

Find the degree of dissociation:

$$KI \rightleftarrows K^+ + I^-, k = 2$$

$$\alpha = \frac{i - 1}{k - 1}$$

$$\alpha = \frac{1.88 - 1}{2 - 1} = 0.88 = 88\ \%$$

Answer: 1.88; 88 %.