In 0.25 liters of solution contains 2.3 gm of non-electrolite at 17°c and osmotic pressure is 488.2kPa. Find molecular weight of this non-electrolite solution.

Solution

To find molecular weight of non-electrolite solution we should use Mendeleev-Clapeyron equation as far as substances dissolved in non-electrolite solution behave as gases.

$PV = nRT$; $n = m/M$;

$PV = RTm/M$,

$M = RTm/PV$.

$m = 2.3$ gm,

$T = 273 + 17 = 290$ K,

$P = 488200$ Pa,

$R = 8.314$ $JK^{-1}mol^{-1}$,

$V = 0.25$ L $= 0.25$ $dm^3 = 0.25*10^{-3}m^3$.

$M = 8.314*290*2.3/ (488200*0.25*10^{-3}) \cong 45$ (gm/mol).

Answer: 45 gm/mol.

Answer provided by AssignmentExpert.com