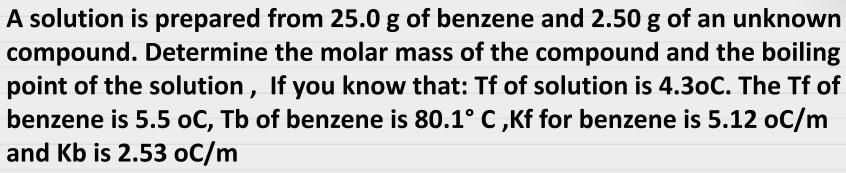


Physical Pharmacy



Non-electrolytes 5

Example: 1



Answer

Since we want to calculate the Mwt of the compound ... We have to calculate the

$$\Delta T_f = K_f m$$
 m = Wt / Mwt x 1000/ Wt of solvent

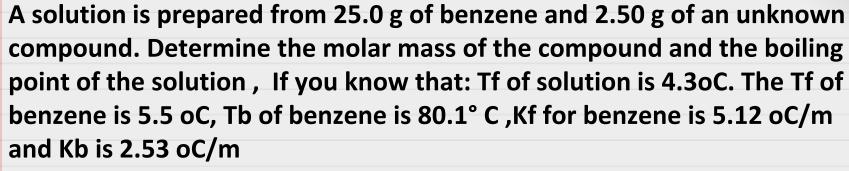
$$\Delta T_f = T_{f \text{ solvent}} - T_{f \text{ solution}}$$
 0.234 = 2.5 / Mwt x 1000/ 25

$$= 5.5 - 4.3 = 1.2$$
 Mwt = 427.35

$$m = \Delta T_f / K_f = m = 1.2/5.12 = 0.234$$



Example: 1



$$\Delta T_b = K_b m$$

= 2.53 x 0.234= 0.592°C

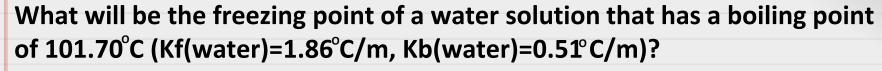
$$\Delta T_b = T_b \text{ solution} - T_b \text{ solvent}$$

$$0.592 = T_b \text{ solution} - 80.1$$

$$T_b \text{ solution} = 80.692^{\circ} \text{C (Elevation)}$$



Example: 2



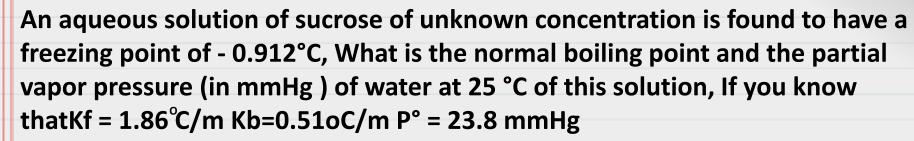
Answer

m = 1.7/0.51 = 3.33

$\Delta T_f = T_f solvent - T_f solution$	$\Delta T_f = K_f m =$
We have to calculate ΔT_f to find the T_f solution	1.86 × 3.33 = 6.193 ℃
$\Delta T_f = K_f m$	
ΔT _b = T _b solution — T _b solvent	$\Delta T_f = T_{f \text{ solvent}} - T_{f \text{ solution}}$
$\Delta T_b = 101.7 - 100 = 1.7^{\circ}C$	6.193 = zero - Tf solution
$\Delta T_b = K_b m$	$T_{f solution} = -6.193 C (Depression)$
$m = \Delta T_b / K_b$	•



Example: 3



$$\Delta T_b = T_b$$
 solution $-T_b$ solvent

$$\Delta P = P_{solvent} - P_{solution}$$

$$\Delta T_f = T_f \text{ solvent} - T_f \text{ solution}$$

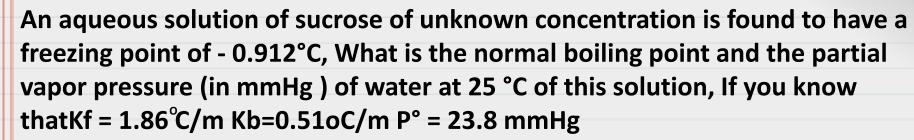
$$\Delta T_f = zero - (-0.912) = 0.912$$
°C

$$\Delta T_f = K_f m$$

$$0.912 = 1.86 \times m$$



Example: 3



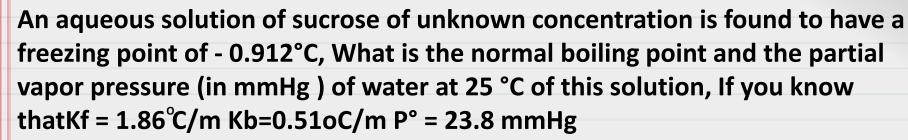
$$\Delta T_b = K_b m$$

$$= 0.51 \times 0.49 = 0.249$$
 °C

$$\Delta T_b = T_b$$
 solution $-T_b$ solvent

$$0.249 = T_{b \text{ solution}} - 100$$

Example: 3

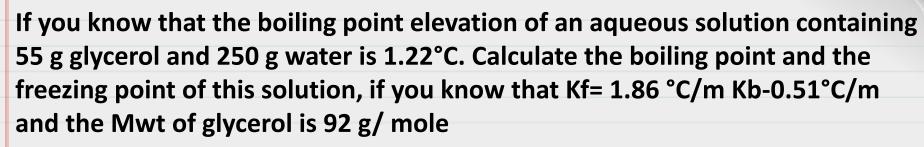


$$\Delta P / P^{\circ}=0.018$$

 $\Delta P=P^{\circ}0.018 \text{ m}$
= 23.8×0.018×0.49 = 0.209 mmHg



Example: 4



$$\Delta T_b = T_b \text{ solution} - T_b \text{ solvent}$$

$$\Delta T_f = 1.86 \times 2.39 \approx 4.45^{\circ}\text{C}$$

$$\Delta T_f = T_f + 1.25 \times 10^{-10}$$

$$1.22 = T_{b \text{ solution}} - 100$$

$$\Delta T_{f} = T_{f \text{ solvent}} - T_{f \text{ solution}}$$

$$T_{f solution} = -4.45 ^{\circ}C(depression)$$

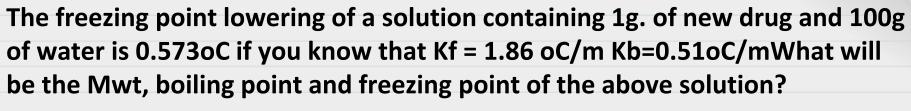
$$\Delta T_f = T_{f \text{ solvent}} - T_{f \text{ solution}}$$

$$\Delta T_f = K_f m$$

$$m = 55 / 92x 1000 / 250 = 2.39$$



Q14



$\Delta T_f = K_f m$	$\Delta T_b = T_b$ solution $-T_b$ solvent
0.573 =1.86× m	$0.157 = T_{b \text{ solution}} - 100$
m = 0.573/1.86 = 0.308	T b solution = 100.157°C
m = Wt / Mwt x 1000/ Wt of solvent	
0.308 = 1 / Mwt x 1000/ 100 = 32.46 g/mol	$\Delta T_f = T_{f \text{ solvent}} - T_{f \text{ solution}}$
	0.573 = zero - Tf solution
$\Delta T_b = K_b m$	Tf solution = - 0.573°C
$= 0.51 \times 0.308 = 0157$ °C	



