Today's Goal

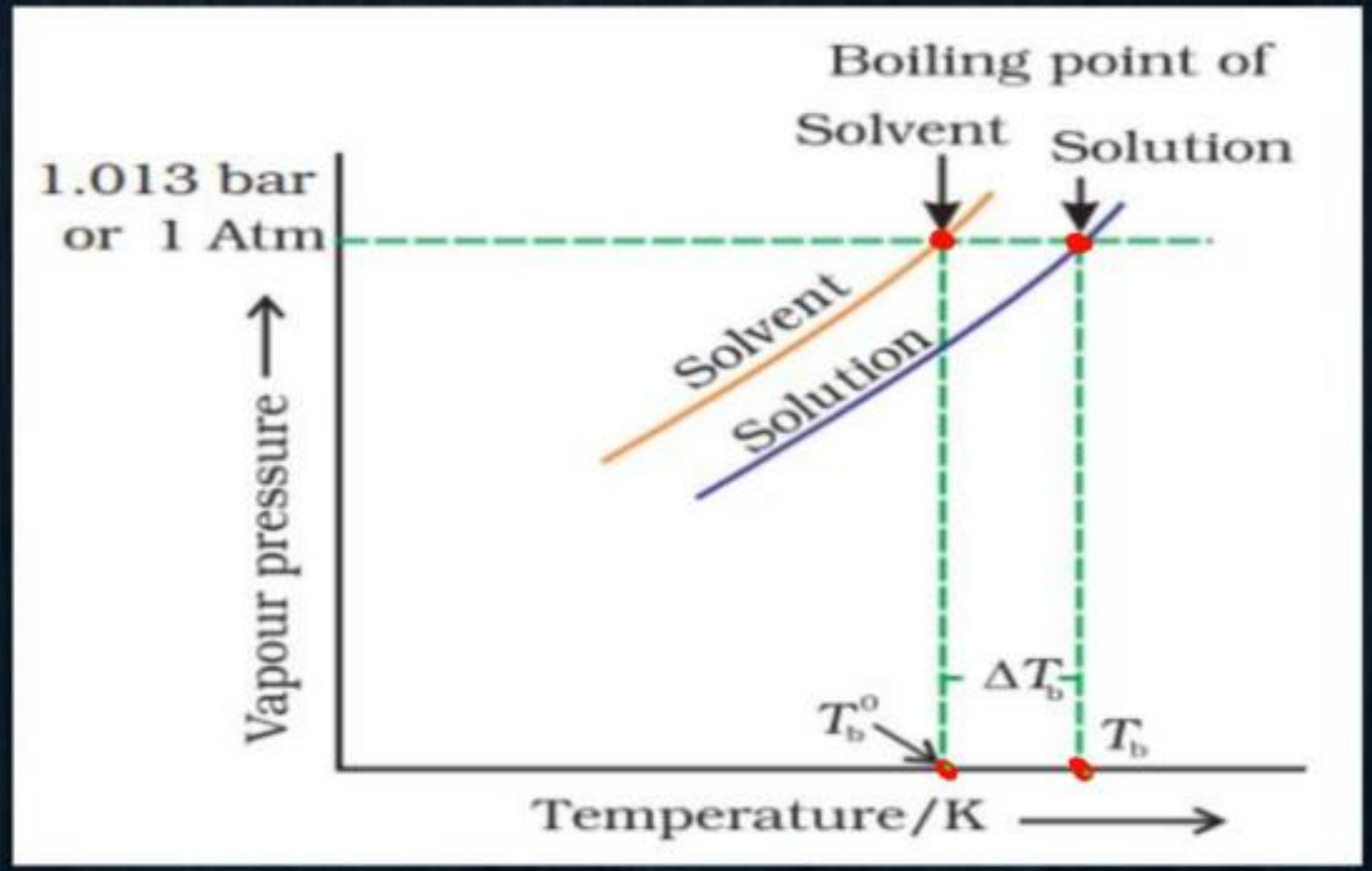
Colligative Properties
Part 2

E.B.P

Elevation in Boiling Point (E.B.P)

When Non-volatile solute is added to volatile solvent vapour pressure decreases thus Boiling Point Increases.

Conceptually



Mathematically

Calculation of molal Elevation constant (Ebullioscopic constant)

Q

The rise in the boiling point of a solution containing 1.8g of glucose in 100g of a solvent is 0.1°C. The molal elevation constant of the liquid is :

A 0.01 K/m

B 0.1 K/m

C 1 K/m

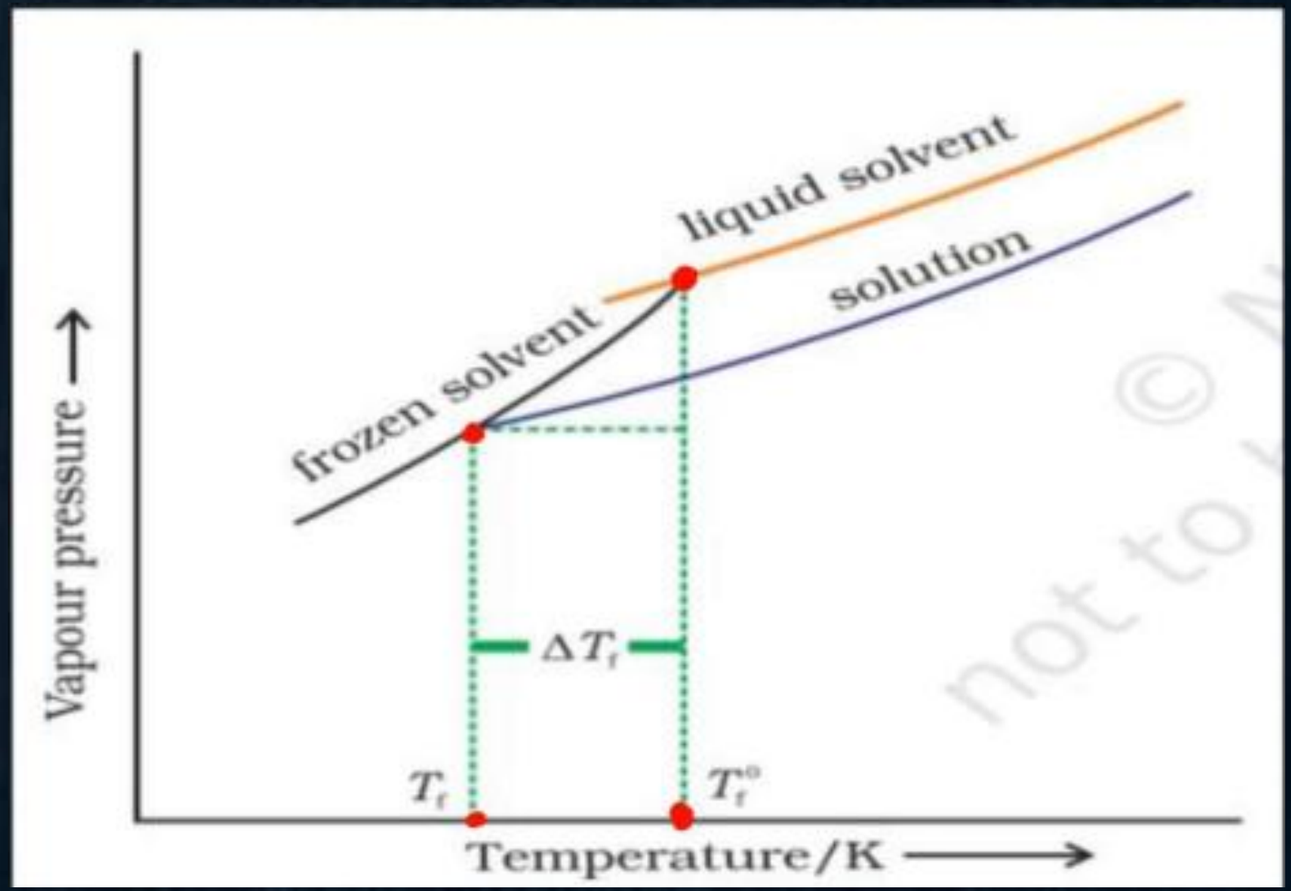
D 10 K/m

D.F.P

Depression in Freezing Point (D.F.P)

When Non-volatile Solute is added to volatile solvent Vapour pressure decreases. Thus, Freezing point decreases

Conceptually



Mathematically

Calculation of molal depression constant (Cryoscopic constant)

Q

When a solution containing non-volatile solute freezes, which equilibrium would exist?

A. Solid solvent – liquid solvent

B. Solid solute – liquid solution

C. Solid solute – liquid solvent

D. Solid solvent – liquid solution

Q

How much Ethyl alcohol must be added to 1.0 L of water so that solution will freeze at -18.6°C? (K_f = 1.86°C/m)

A 20 g

B 10.75 g

C 460 g

D 46 g

Q

K_f of 1, 4-dioxide is 4.9 K kg mol^{-1} . The depression in freezing point for a 0.001 m solution in dioxane is:

A 0.0049

B 49

C 4.9

D 0.49

Q

What mass of Ethylene glycol (molar mass 62.0g mol^{-1}) must be added to 5.50 kg of water to lower the freezing point of water from 0 °C to -10 °C ? (K_f for water = 1.86 K kg mol^{-1}).

A 1.83 Kg

B 100 kg

C 18.3 kg

D 90 kg

Q

How much ice will separate is a solution containing 25 g of ethylene glycol [$C_2H_4(OH)_2$] in 100g of water is cooled from 0°C to -10 °C ? (K_f for water = 1.86 K kg mol^{-1})

A 75g

B 100g

C 25g

D 62g

Q

If the elevation in boiling point of a solution of non-volatile, non electrolytic and non-associating solute in solvent (K_b = x K.kg.mol^{-1}) is y K, then the depression in freezing point of solution of same concentration would be : (K_f of the solvent = z K.kg.mol^{-1})

A $\frac{2xz}{y}$

B $\frac{yz}{x}$

C $\frac{xz}{y}$

D $\frac{yz}{2x}$

Q

Bromoform has a normal freezing point of 7.7 °C /m and it's K_f = 14.4 °C/m. A solution of 2.3g of an unknown solute in 100g of bromoform freezes at 5.4 °C. What is the molecular weight of the unknown solute?

A 14.25

B 142

C 100

D Ky bhaiya shi option dalna bhul gye.

Q

Pure C_6H_6 freezes at 5.5 °C . At what temp. will a solution of 11.6 g of C_4H_{10} in 200g of C_6H_6 freeze? Kf (C_6H_6) = 5.12 °C/m

A 5.12 °C

B 0.38°C

C 5.5 °C

D Hum chomu hai humse na ho paega

Q

An aqueous solution containing 1g of urea boils at 100.25 °C. The aqueous solution containing 3g of glucose in the same volume will boil at: (Molecular mass of urea and glucose are 60 and 180 respectively.)

A 100.75 °C

B 100. 5 °C

C 100.25 °C

D 100°C

Q

The freezing point of a solution prepared from 1.25 g of a non-electrolyte and 20g of water is 272 K. If molar depression constant is 1.86 kg K mol^{-1}, then molar mass of the solute will be:

A 116.25

B 106.7

C 105.3

D 90

Q

What is the effect of the addition of sugar on the boiling and freezing points of water?

Both boiling point and freezing point increases

Both boiling point and freezing point decreases

Boiling point increases and freezing point decreases

Boiling point decreases and freezing point increases

Q

The freezing point of a solution containing 4.8 g of a compound in 60 g of benzene is 5 °C. What is the molar mass of the compound? (K_f = 5 Km^{-1}; freezing point of pure benzene = 5.5°C)

A 100

B 200

C 800

D 400

Q

1.00 g of a non-electrolyte solute (molar mass 250 g mol^{-1}) was dissolved in 51.2 g of benzene. If the freezing point depression constant, K_f of benzene is 5.12 K kg mol^{-1}, the freezing point of benzene will be lowered by:

A 0.5 K

B 0.2 K

C 0.4 K

D 0.3 K

Q

A solution of urea (mol. mass 60 g mol^{-1}) boils at 100.18°C at the atmospheric pressure. If K_f and K_b for water are 1.86 and 0.512 K kg mol^{-1} respectively, the above solution will freeze at:

A -6.54 °C

B 6.54°C

C 0.654°C

D -0.654 °C

Q

The vapour pressure curves of the same solute in the same solvent are shown. The curves are parallel to each other and do not intersect. The concentrations (molality) of solutions are in order of:

A. I < II < III

B. I = II = III

C. I > II > III

D. I > III > II