(c) Suppose that during the experiment a significant but unknown amount of solvent evaporates from the test tube. What effect would this have on the calculated value of the molar mass of the solid (i.e., too large, too small, or no effect)? Justify your answer.

(d) Show the setup for the calculation of the percentage error in a student's result if the student obtains a value of 116 g mol⁻¹ for the molar mass of the solid when the actual value is 120 g mol⁻¹.

(ii) The mass (g) of the unknown reactant must be found before hand using the balance. The amount of pure solvent must also be known in kg (which can be calculated from volume if the density is known).

(iii) DT is found by experiment: heat the solution to 100°C and cool the hot-water bath while recording time vs. temperature data (thermometer) and the time by noting an ice bath until the beaker to 0°C. The difference between the experimental freezing point and the pure freezing point is AT. Since AT = Kf · molality, and AT = kg are known, molality (kg unknown) can be calculated as:

\[
\text{molality} = \frac{\text{kg solvent} + \text{kg unknown}}{\text{M. M. (molar mass)}} = \frac{\text{agt unknown}}{\text{mol of unknown}}
\]

(i) If some of the solvent evaporates, the experimental molality will be too large and so will the # of mol of unknown (calculated). AT = Kf · smaller than expected

\[
\text{mol kg}^{-1} \cdot \text{kg} = \text{mol} \Rightarrow \text{smaller than expected}
\]

The M. M. will be too small as well, will be divided by more mol than there should be.

(iv) % error = \[ \frac{\text{theoretical value} - \text{experimental value}}{\text{theoretical value}} \]

\[
\frac{120. \text{ mol}}{100. \text{ mol}} = 1.20 = 0.05 = 5\% \text{ error}
\]