Question 1. Calculate the mass of ascorbic acid (Vitamin C, C6H8O6) to be dissolved in 75 g of acetic acid to lower its melting point by 1.5°C. Kf = 3.9 K kg mol-1.

Ans: Mass of acetic acid, w1= 75 g Molar mass of ascorbic acid ($C_6H_8O_6$),

$M_2=6\times12+8\times1+6\times16$

$=176 g mol^{-1}$

Lowering of melting point, $\Delta T_f=1.5K$

We know that:

$\Delta T_b=M_2\times w_1K_b\times1000\times w_2$

$w_2=K_b\times1000\Delta T_b\times M_2\times w_1$

$w_2=3.9\times10001.5\times176\times75$

$w_2=5.08g$

Hence, 5.08 g of ascorbic acid is needed to be dissolved.