

Answer on question 80853 – Chemistry – General Chemistry

1) In the base, let's get formula "The Change in Freezing Point Equation":

$\Delta T = i \cdot m \cdot K$ , where  $i$  – van't Hoff factor,  $m$  – molality (moles solute/kg solvent),  $K$  – boiling point elevation;

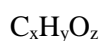
In our way,  $K = 3.63^\circ\text{C}/m$ ,  $\Delta T = 2.699^\circ\text{C}$ ,  $i = 1$  (nonelectrolytes), we ought to find molality:

$$m = \Delta T / i \cdot K = 2.699 / 1 \cdot 3.63 = 0.744 \text{ moles/kg};$$

So,  $m = X/\text{kg}$ ;  $X = m \cdot \text{kg} = 0.744 \cdot 0.001 = 0.000744$  moles;

$M$  (molar mass) =  $m(\text{retinol})/X = 0.213/0.000744 = 286.3$  gm/moles;

2)  $w(\text{C}) = 83.84\%$ ,  $w(\text{H}) = 10.58\%$ ,  $w(\text{O}) = 5.58\%$ ; Formula - ?:



Let's find quantity of atoms:

$$n(\text{C}) = 286.3 \cdot 83.84 / 12 \cdot 100 = 20;$$

$$n(\text{H}) = 286.3 \cdot 10.58 / 1 \cdot 100 = 30.3;$$

$$n(\text{O}) = 286.3 \cdot 5.58 / 16 \cdot 100 = 1;$$

We can say, that  $x = 20$ ;  $y = 30$ ;  $z = 1$  and formula has view  $\text{C}_{20}\text{H}_{30}\text{O}$ .

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