

Non Sibi High School

Andover's Chem 300: Accelerated/Honors Chemistry

Chapter 21, Review Quiz 1

1

Calculate the mass of caffeine, $\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2$, that must be dissolved in 75.0 grams of dichloromethane, CH_2Cl_2 , to create a 0.103 m solution.

2

To create a 0.22 m solution, how many grams of carbon disulfide must be used to dissolve 2.7 grams of Br_2 ?

3

The freezing point of benzene, C_6H_6 , is 5.5°C and the boiling point of benzene is 80.1° . Given that $K_f = 5.12^\circ\text{C}/m$ and $K_b = 2.53^\circ\text{C}/m$ for benzene, calculate the molality, the freezing point, and the boiling point of a solution containing 17 grams of camphor, $\text{C}_{10}\text{H}_{16}\text{O}$, dissolved in 66 grams of benzene.

4

Rank the following aqueous solutions in order from lowest to highest freezing point and from lowest to highest boiling point without performing detailed calculations:

0.018 m K_3PO_4

0.020 m SrBr_2

0.025 m $\text{C}_6\text{H}_{12}\text{O}_6$

0.025 m HI

0.025 m HNO_2

5

- a. A molecular solute that does not ionize was found to be 38.7% carbon and 9.7% hydrogen by mass, with the remainder being oxygen. Determine the empirical formula of the solute.
- b. A solution containing 1.6 grams of the solute dissolved in 9.8 grams of water was found to freeze at -4.9°C . If K_f for water is $1.86^{\circ}\text{C}/m$, determine the molar mass and molecular formula of the solute.



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