

Problem of the Day 11 CHEM 1252

Chapter 13: 5, 23, 28, 34, 38, 40, 68

1. Which gives the more concentrated solution, stearic acid in water or stearic acid in CCl_4 ? The formula for stearic acid is $\text{CH}_3(\text{CH}_2)_{16}\text{COOH}$. *You must justify your answer.*

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2. a) Glycerol, $\text{C}_3\text{H}_5(\text{OH})_3$, is a nonvolatile molecular liquid that is very soluble in water. A solution is made by dissolving 75.0 g of glycerol in 350.0 g of water. What is the freezing point of the solution? Remember: $\Delta T_f = iK_f m$ where i is the van't Hoff factor and $K_f = 1.86 \text{ }^\circ\text{C/m}$ for water.

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b) Why is glycerol extremely soluble in water?

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3. Explain, at the microscopic level, why the boiling point of a solution is higher than the pure solvent.

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4. A sample of 0.892 g of potassium chloride (KCl) is dissolved in 54.6 g of water.

a) What is the mass percent of KCl in the solution?

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b) What is the molality of the KCl solution?

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5. Explain how the formation of a solution can be endothermic and spontaneous.

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