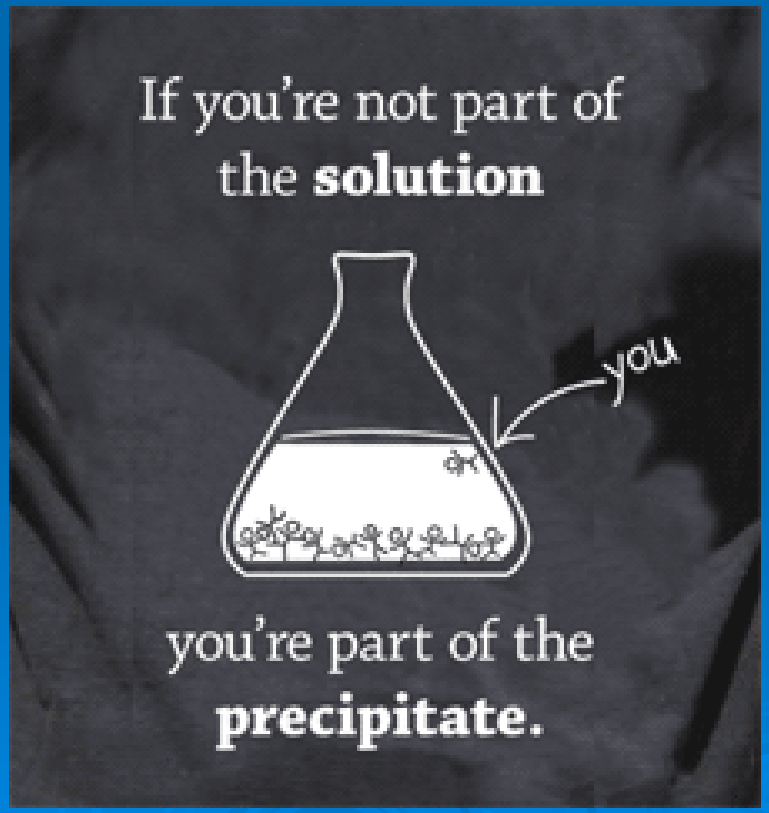
AP Chemistry
Chapter 13 Jeopardy

Jennie L. Borders

Round 1 – Chapter 13



Solubility	Mole Fraction	Molarity	Colligative Properties	FP, BP, VP	Surprise
100	100	100	100	100	100
200	200	200	200	200	200
300	300	300	300	300	300
400	400	400	400	400	400
500	500	500	500	500	500

Solubility 100

If the formation of a solution is endothermic, then how can it be spontaneous?

Increase in entropy

Solubility 200

Based on intermolecular forces, why does C_8H_{18} not dissolve in H_2O?

H_2O has hydrogen bonding and C_8H_{18} has London dispersion. These intermolecular forces are very different. (Like dissolves like.)

Solubility 300

Gases are the most soluble in liquids a _____ pressures and _____ temperatures.

High, low

Solubility 400

Which of the following substances would be the most soluble in CCl_4?

CH_3CH_2OH, H_2O, NH_3, $C_{10}H_{22}$, NaCl

$C_{10}H_{22}$

Solubility 500

Which of the following substances would be most soluble in hexane (C_6H_{14})?

CH_3OH, $CH_3CH_2CH_2OH$, CH_3CH_2OH, $CH_3CH_2CH_2CH_2OH$, $CH_3CH_2CH_2CH_2CH_2OH$

$CH_3CH_2CH_2CH_2CH_2OH$

Mole Fraction 100

What is the mole fraction of He in a gaseous solution prepared from 4.0g of He, 6.5g of Ar, and 10.0g of Ne?

0.601

Mole Fraction 200

What is the mole fraction of urea (molar mass = 60 g/mol) in a solution prepared by dissolving 16g of urea in 39g of H_2O?

0.11

Mole Fraction 300

Calculate the mole fraction of hydrochloric acid in a 10% by mass aqueous solution.

0.053

Mole Fraction 400

Calculate the mole fraction of phosphoric acid in a 25.4% by mass aqueous solution.

0.059

Mole Fraction 500

What is the mole fraction of NH_3 in a solution prepared by dissolving 15g of NH_3 in 250g of H_2O? The density of the resulting solution is 0.974 g/mL.

0.0596

Molarity 100

What is the molarity of a solution prepared by dissolving 5.5g of HCl in 200g of C_2H_6O? (D = 0.79 g/mL)

0.588M

Molarity 200

What is the molarity of sodium chloride in a solution that is 13% by mass NaCl? (D = 1.10 g/mL)

2.49M

Molarity 300

What is the molarity of ammonium chloride in a aqueous solution that is 24.0% by mass ammonium chloride? (D = 1.0674 g/mol)

4.79M

Molarity 400

What is the mass % of ammonium chloride in a 0.376M aqueous solution of ammonium chloride? (D = 1.0045 g/mL)

1.98%

Molarity 500

If you are asked to calculate the molarity of a 10% by mass aqueous solution of hydrochloric acid, then what piece of additional information do you need?

Density of the solution

Colligative Properties 100

Which of the following produces the greatest number of ions when one mole dissolves in water? NaCl, NH_4NO_3, NH_4Cl, Na_2SO_4, sucrose

Na_2SO_4

Colligative Properties 200

Which of the following liquids will have the lowest freezing point?

Pure H_2O, 0.05M glucose, 0.03M CoI_2, 0.03M FeI_3, or 0.03M NaI

0.03M FeI_3

Colligative Properties 300

Which of the following solutes will have the lowest vapor pressure in an aqueous solution (assume all are 0.1M)?

$KClO_4$, $Ca(ClO_4)_2$, $Al(ClO_4)_3$, sucrose, or NaCl

$Al(ClO_4)_3$

Colligative Properties 400

Which of the following aqueous solutions will have the highest boiling point?

0.1M Na_2SO_4, 0.2M glucose, 0.25M sucrose, 0.1M NaCl, or 0.1M $SrSO_4$

0.1M Na_2SO_4

Colligative Properties 500

Which of the following liquids will have the lowest freezing point?

0.6M glucose, 0.6M sucrose, 0.24M FeI_3, or 0.5M KF

0.5M KF

FP, BP, and VP 100

The freezing point of C_2H_5OH is -114.6°C. The molal freezing point depression constant for ethanol is 2.00 °C/m. What is the freezing point of a solution prepared by dissolving 50g of $C_3H_8O_3$ in 200g of ethanol?

-120°C

FP, BP, and VP 200

Calculate the freezing point of a solution containing 5g of KCl and 550g of water. The molal freezing point depression constant (k_f) for water is 1.86 °C/m.

-0.459 °C

FP, BP, and VP 300

A man places 4.01kg of water in a pan and brings it to a boil. Before adding pasta, he added 58g of salt to the water and again brings it to a boil. What is the boiling point of the salty water if the k_b for H_2O is 0.52 °C/m.

100.26 °C

FP, BP, and VP 400

A solution containing 10g of an unknown liquid and 90g of water has a freezing point of -3.33°C. Given k_f = 1.86 °C/m for water, what is the molar mass of the liquid.

62.11 g/mol

FP, BP, and VP 500

The vapor pressure of pure water at 25°C is 23.8 torr. What is the vapor pressure (in torr) of water above a solution prepared by dissolving 18g of glucose in 95g of water?

23.32 torr

Surprise 100

What is the phrase used to know whether or not a solvent will dissolve in a solute?

Like dissolves like.

Surprise 200

What is a supersaturated solution and how is it formed?

A supersaturated solutions has more solute than possible at a given temperature. It is formed by heating a solution and dissolving more solute, then carefully cooling the solution to avoid recrystallization.

Surprise 300

What is the effect with light that occurs with colloids?

Tyndall Effect

Surprise 400

What is the molality of a solution with a concentration of lead (II) nitrate of 0.726M? (D = 1.202 g/mL)

0.754 m $Pb(NO_3)_3$

Surprise 500

What is the osmotic pressure of a solution formed by dissolving 25mg of aspirin ($C_9H_8O_4$) in 0.25L of water at 25°C?

0.014 atm