$\dfrac{11}{15}$

insight

Name: _

1. What is the purpose of adding salt to the cooling ice bath in today's experiment?

Salt decreases the freezing point of water.

③

insight
c l u b

2. Given the following aqueous solutions: 0.45 0.36
   $i = 2$ A) 0.18 m KCl; 0% B) 0.15 m Na_2SO_4;   C) 0.12 m $Ca(NO_3)_2$; $i = 2$
   D) pure water;   E) 0.20 m $C_2H_6O_2$ (ethylene glycol) 6.2

a) Which of the above solutions has the lowest freezing point?

$Tf \nearrow m \nearrow$ ~~water has lowest freezing pt (0°C) then~~

0.20 m $C_2H_6O_2$ has lowest freezing pt.

4 ②

b) Which of the above solutions has the lowest boiling point point?

$Tb \nearrow m \nearrow$
lowest Tb is 0.12 m $Ca(NO_3)_2$

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3. What is the molar mass of toluene if 0.85 g of toluene (a nonelectrolyte) depresses the freezing point of 100. g of benzene by 0.47°C? K_f of benzene is 5.12°C/m.

0.85g $Tf = 100°C$ $Tf = 0.47°C$
          δ bzg δ ben
                            100g

$\Delta Tf = T°f - Tf$

$\Delta Tf = K_f \cdot m$

$m = \dfrac{n}{m(kg)}$

$m = \dfrac{\Delta Tf}{K_f} = \dfrac{0.47}{5.12} = 0.09\ m$

$m = \dfrac{n}{m(kg)} \implies n = m \times m(kg)$

$= 0.09 \times 100 \times 10^{-3}$

$= 9 \times 10^{-3}\ mol$

⑥

$n = \dfrac{m}{M} \implies M = \dfrac{m}{n} = 94.44\ g/mol.$

Time: 10'

Chem 205
Drop Quiz 7

Friday, April 5, 2013
H. Deeb

1^{0}

insight
c l u b

Name:

1. How many grams of $BaSO_4$ (formula weight = 233) will dissolve in 1.7 L of water? ($Ksp = 1.1 \times 10^{-10}$)

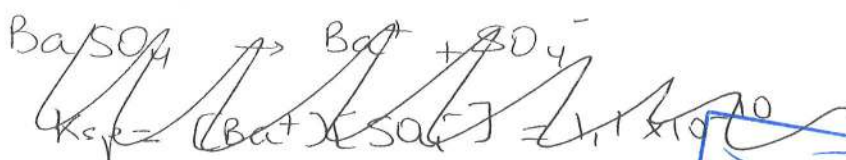$$BaSO_4 \longrightarrow Ba^+ + SO_4^-$$
$$ s s$$

$$s^2 = Ksp$$
$$s = \sqrt{Ksp}$$
$$= 1.1 \times 10^{-5}$$

$$n = \frac{m}{M} \Rightarrow m = n \times M$$

$$BaSO_4 \rightarrow Ba^+ + SO_4^-$$

$$Ksp = [Ba^+][SO_4^-] = 1.1 \times 10^{-10}$$

$$[BaSO_4] = \frac{n}{V}$$

insight
c l u b
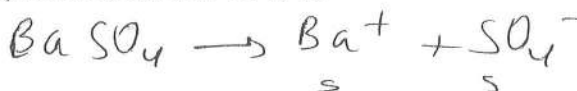
$$n = [BaSO_4] \times V$$
$$= 1.1 \times 10^{-5} \times 1.7 = 1.87 \times 10^{-5}$$
$$n = \frac{m}{M} \Rightarrow m = n \times M = 1.87 \times 10^{-5} \times 233 = 4.35 \times 10^{-3} \, g.$$

2. Classify each of the following as water soluble or water insoluble compound.
   $Al(OH)_3$, $FeCl_3$, K_3PO_4, $(NH_4)_2CrO_4$, $MgCO_3$
   Answer:
   Water soluble: $FeCl_3$, $(NH_4)_2CrO_4$, K_3PO_4

   Water insoluble: $Al(OH)_3$, $MgCO_3$.

3. How would you separate a mixture of Hg_2^{2+} and Ag^+ using ammine complex formation? Write the chemical equations involved, if applicable.

   It's not applicable because Hg_2^{2+} and Ag^+ are ions from group I. they can be separated by Cl not ammine complex.

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