**Dougherty Valley HS AP Chemistry**

**WORKSHEET #2**

**Solutions – Solutions and their behavior**

**Name: Date: Period: Seat #:**

Show all work and/or explain using chemistry principles

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| [1] A solution of salt (molar mass 90 g mol-1) in water has a density of 1.29 g/mL. The concentration of the salt is 35% bymass. Assume a 100 mL sample.  |
| 1. Calculate the molarity of the solution. 5.0 M
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| 1. Calculate the total number of moles in the solution. 4.0 mol
 |
| 1. Calculate the mole fraction of the salt in the solution. 0.10
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| [2] Ethylene glycol (C2H4(OH)2; 150 grams) is added to ethanol (C2H5OH; 250 grams). |
| 1. Calculate the mass % of ethylene glycol in the solution. 37.5 %
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| 1. Calculate the mole fraction of ethylene glycol in the solution. 0.31
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| [3] Concentrated sulfuric acid contains very little water, only 5.0% by mass. It has a density of 1.84 g/mL. What is the molarity of this acid? 17.8 M |

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| [4] The lattice energy of a salt is 350 kJ/mol and the solvation energies of its ions add up to 320 kJ/mol for the preparation of a 0.50 M solution. In the preparation of this solution would the solution get colder or warmer? What is the driving force for this solution process? |

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| [5] Addition of excess sodium nitrate to water to form a saturated solution results in the following equilibrium. The solutionprocess is endothermic. **NaNO3 (s) ⇔ Na+ (aq) + NO3− (aq)**How could the concentration of sodium nitrate in the solution be increased? Explain why & why not for each. Choose the answer |
| 1. add more NaNO3 (s)
 |
| 1. increase the pressure on the solution
 |
| 1. increase the temperature
 |
| 1. stir the solution more vigorously
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| [6] Ethanol and methanol form an almost ideal solution. If 64 g of methanol is mixed with 69 g of ethanol, what is the total vapor pressure above the solution? 70.7 torr [$P\_{methanol}^{°}=90 torr; P\_{ethanol}^{°}=45 torr$] |