CHEM 1210
Optional Quiz version 3
Thermodynamics and solutions Name: _____

1) The enthalpy of vapourization of water is 44.0 kJ/mol, determine q, w, ΔH, ΔS, ΔG, and ΔE for the vapourization of 1 mole of water at 100.°C and 1.00 bar.

2) The energy of combustion of octane was determined by combusting 0.850 g of octane in a bomb calorimeter. The heat capacity of the calorimeter had previously been determined to be 6.25 kJ/°C, and the observed temperature change was 6.55°C. Determine the energy of combustion of octane in kJ/mol

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3) Hard candy is made from very hot solutions of sugar in water. In a typical preparation the boiling point of the sugar-water solution reached 145°C. If the boiling point elevation constant of water is 0.512 °C kg/mol, determine the mass of sugar ($C_{12}H_{22}O_{11}$, molar mass 342.3 g/mol) that would be required for 500. mL of water.

4) At 24°C the vapour pressure of pure liquid C is 328.0 mmHg, and the vapour pressure of pure liquid D is 174.6 mmHg. A solution is prepared in which the mole fraction of C is 0.048. The vapour pressure of the solution is 184.8 mmHg,

a) Does this solution obey Raoult's law? Show all calculations necessary to answer the question.

b) Would you predict ΔH for the solution process to be positive, negative or equal to zero?

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