**Chem 6854: Physical Chemistry**

**Homework Assignment #8**

 Show work !

Due Wednesday 30 April (last homework of year !!!)

 (33 points/ 3 points each)

*The first problem here mimics our thermochemistry lab and provides just a little more exercise in seeing how heat flows from one system to another in contact.*

8.1 Problem 19.25 page 803 of text

*The next two problems are illustrations of `practical’ thermochemical calculations used to characterize chemical reactions*

8.2 Problem 19.22 (just the constant P case) page 803 of text

8.3 Problem 19.23 page 803 of text

*Hess’s law is a particularly useful relationship using enthalpies to predict new reaction heats. The three problems below are typical examples of the law’s use in predicting thermochemical behavior.*

8.4 Problem 19.35 page 804 of text

8.5 Problem 19.36 page 805 of text

8.6 Problem 19.37 page 805 of ext

*The ideas underlying the Second Law of Thermodynamics are the most novel and interesting of the three Laws. The notion of path independence, exact differentials and state functions are part of the novelty. In particular, it is a mathematical truism that if df = M(x,y) dx + N(x,y) dy is such that* $\frac{∂M}{∂y}= \frac{∂N}{∂x}$ *, then df is and exact differential and Δf is independent of how you get from state 1🡪 state 2. (The above equality is what McQuarrie is talking about when he mentions the `criterion in MathChapter H). The next three problems give you practice using the above `criterion’ to decide of you have a state function= perfection differential function which is path independent.*

8.7 Problem 20.1 page 844

8.8 Problem 20.2 page 844

8.9 Problem 20.3 page 844

*Entropy (ΔS) is the most interesting and new state function introduced by the Second law. Getting a feeling for its computation and behavior for a simple system using ideal gases provides a basic grounding in the behavior of entropy as conditions change. The last two problems in this homework are aimed at starting to give you a feeling for this universal measure of chaos.*

8.10 Problem 20.6 page 845

8.11 Problem 20.8 page 845