Department of Physics, University of Maryland, College Park, MD 20742-4111

Physics 404   **HOMEWORK ASSIGNMENT #2**   **Spring 2013**

Due date: Thursday, Sept. 19   **Deadline:** Tuesday, Sept. 25

All problems are from Schroeder's text.

1. (5) 1.28 Time to heat water in microwave. Assume the water is initially at 20°C.

2. (10) 1.34 This problem involves computing work during isobaric and isochoric/isovolumetric processes.

3. (10) 1.36 a & b, 1.37 Adiabatic processes, including why Diesel engines do not need spark plugs. In 1.36 b, you must derive the general formula for work done in an adiabatic process, a *very* important result. In 1.37 assume for simplicity that $f = 5$ for air (even though it will be 7 at the high-temperature compressed situation).

4. (5) 1.41 Measuring heat capacity.

5. (10) 1.47 & 1.54c Exercise using heat capacity and latent heat: Using ice to cool a drink and how much water to drink while hiking. In 1.54c, you may use the result of 1.54a that the mechanical work in climbing to the summit is 210 kcal, that the hiker is only 25% efficient, and that the remaining food (chemical) energy is thermal energy that must be dissipated by sweating (evaporating water). Note that at 25°C the latent heat involved is 40 kcal/kg *higher* than at 100°C.