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

Physics 404 **HOMEWORK ASSIGNMENT #4** **Spring 2013**

Due date: Thursday, Oct. 3 **Deadline:** Tuesday, Oct. 8

1. (5) 3.1 Explicit calculation of Cv using Table 3.1. Use the center-difference approximation: take a difference of the values just above and just below the point where you seek the derivative.

2. (15) 3.34 (except g) Use of 2-state model to understand the negative linear expansion coefficient of rubber.

3. (15) 3.24 Consideration of the Einstein model with Excel. Warning: when doing the case N=5000, you will probably not be able to go beyond q=160 or so. This will not hinder you in finding the low-temperature behavior of the heat capacity, which is the goal of this problem.

4. (15) 3.25 (except f) Analytic consideration of the Einstein model.

5. (10) 2.37. Mixing of non-equal quantities of gases. The initial volumes of the 2 gases are proportional to their number. They should be imagined as ideal gases having the same pressure. Thus, for example, the xN B molecules expand to fill a volume that is greater by a factor 1/x.