PHY 292F – WAVES AND PARTICLES
DEPARTMENT OF PHYSICS, UNIVERSITY OF TORONTO

TUTORIAL #6

TUTORIAL DATE: Thursday 29 November 2009

1. Calculate the average volume per molecule for an ideal gas at room temperature and atmospheric pressure. Use this to estimate the average distance between molecules. How does this distance compare to the size of a small molecule like N_2 or H_2O (average diameter 100-200 pm)?

2. Using the equipartition theorem, estimate the heat capacity at constant pressure for aluminum.
   a) Compare your value to that from the reference data section of Schroeder. Is your prediction reasonable for aluminum at room temperature? Are any of the degrees of freedom "frozen out" at room temperature?
   b) Calculate the total thermal energy of 1 gram of aluminum at room temperature.