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Physics 404 **HOMEWORK ASSIGNMENT #10** **Spring 2007**

Due date: Tuesday, May 8 **Deadline:** Thursday, May 10 (last class)

S means a problem in Schroeder's text; GT means a problem in Gould & Tobochnik.

1. S 7.44 Note that $\int_0^\infty \frac{x^2}{e^x - 1} dx \approx 2.404$

2. S 7.52

3. S 7.54

4. S 7.63 The general solution for the specific heat is $C = \frac{2Nk_B T^2}{T_D^2} \int_0^{T_D/T} \frac{x^3 e^x}{\left(e^x - 1\right)^2} dx$, which you do not need to plot. Also, you can quote the result of numerical integration given in the hint to S 7.44 above.

5. S 7.66

6. S 7.70 a–c. In part b) set μ = 0 and use $\int_0^\infty \frac{x^{3/2}}{e^x - 1} dx \approx 1.783$.

   In part b) you should show that $C_V = 1.926\ (T/T_c)^{3/2}$.

   Using this, show that (for $T < T_c$) $S(T) = 1.284\ N\ k_B\ (T/T_c)^{3/2}$ and $F(T) = -0.514\ N\ k_B\ T\ (T/T_c)^{3/2}$.