Answers to selected problems part II

6.20 (b) $Z = (1 - e^{-\beta\epsilon})^{-1}$
6.26 $Z = 1 + 3e^{-2\beta\epsilon}$
6.42 (b) $S = -Nk\ln(1 - e^{-\beta\epsilon}) + Nk\frac{\epsilon/kT}{e^{-\beta\epsilon}-1}$
6.47 2.6×10^{-15} K
6.48 (a) S=205 (J/K)
6.52 $Z_1 = 2LkT/hc$.
7.43 (a) 0.866 J; (c) 37%.
7.44 (b) 3.6 (c) 5.5×10^{14} at room temperature
7.45 2.5×10^{16} Pa.
7.46 (a) -U/3
7.51 (a) $66mm^2$; (b) 1.7 μm; (d) 8 %.
7.52 (a) 1kW
7.54 (a) 1.69 times the sun (b) 0.007
7.56 (a) 333 K.
7.63 $C = (2.404)6NkT^2/T_D^2$ for $T \ll T_D$ and $C = Nk$ for $T \gg T_D$

These are selected problems from the textbook which might be useful in understanding the course material in preparation for the test. For those of you yearning for more problems, Chaps. 6 and 7 of Reif's book contains many interesting problems using canonical distributions. Some of them even have answers in the back of the book. Kittel and Kroemer's book also has a few interesting problems. The relevant chapters are Chaps. 3 and 4.