Problem 1. Problem 2-1.


Problem 3. Consider the gas of relativistic fermions with energy $\varepsilon(p) = cp$, where $p$ is momentum of a fermion. Find the Fermi energy $E_F$, internal energy $W$ at $T = 0$ and the specific heat for $T \ll E_F$ for this gas with particle density $n$.

Problem 4. Derive a relation connecting the pressure and volume of an electron gas at 0K. Estimate the electron pressure for potassium, copper and gold.

Problem 5. The atom He$^3$ has spin 1/2 and is a fermion. The density of liquid He$^3$ is 0.081g/cm$^{-3}$ near absolute zero. Calculate the Fermi energy $E_F$ and the Fermi temperature $T_F$. 