I'm working through the practice final and had a question about 5b. Is it asking us to find <E^2>? Are we supposed to do a sommerfeld expansion for low T?

In part b you do T=0, but in part c, you should use the Sommerfeld expansion.

Also, do you think you could add the following to the study guide? Presume you mean the formula sheet.

- Quantum wavelength It is already there: left column, 1/3 way down.
- Wein's law (and constant) OK (Not Wein but Wien, meaning Vienna, but it is a surname.)
- u(f) = 8 \pi (f/c)^3 / (e^(\beta h f) - 1) It is there, right col., 2/3 way down, with eps = hf
- Stefan Boltzmann constant (\sigma) Not needed or I will supply the value
- F = -kT ln(Z) OK
- N = integral g(\epsilon) d\epsilon from 0 to \epsilon_F You should know this from the meaning of density of states and the physics of a Fermion gas at T=0

On the final, will we need to know refrigerators and heat engines and their efficiencies? And also will we need to know the Otto, Carnot, diesel, etc cycles and their PV diagrams? Just wondering because I didn't see anything relating to them on the formula sheet.

You should know about heat engines and efficiency, but there will not be questions about refrigerators or coefficient of performance. You should know about what happens along the 4 possible PV paths that we studied: isothermal, adiabatic, isobaric, isochromic. You do not need to remember the specific combination in Otto, Diesel, or other cycles.

There also will be no questions about chemical reactions and equilibrium constants, nor about effusion through small holes.