

Before-class Questions #5:

Question 1: What are the atomic units for energy, length and velocity?

Answer: Hartree $\alpha^2 * mc^2$, Bohr radius $\alpha * (\hbar/mc)$, $\alpha * c$

Question 2: What modification has to be done to convert an equation from cgs to SI units?

Answer: Replace e^2 by $(e^2/4 \pi \epsilon_0)$

Question 3: For a hydrogen wavefunction: How does the average of $1/r$ depend on n and l ?

Answer: $(1/r)$ prop to $(1/n^2)$ independent of l

Question 4: What is the microscopic nature of the energy difference between the $1s 2s$ singlet and triplet states of helium?

Answer: Coulomb energy between the two electrons (exchange energy)

Question 5: By what mechanism can the lowest triplet state of helium decay?

Answer: One-photon M1 transition