

Name _____

Date _____

PH 102 Quiz 8 SOLUTION

Note that these questions were taken directly from the homework.

1. The resolving power of a microscope is proportional to the wavelength used. A resolution of 1.0×10^{-11} m (0.010 nm) would be required in order to "see" an atom. If electrons were used (electron microscope), what minimum kinetic energy would be required for the electrons? Ignore relativity.

- 15 keV
- 10 MeV
- 3 keV
- 125 keV

2. Same question as above, but using *photons* in place of electrons.

- 15 keV
- 10 MeV
- 3 keV
- 125 keV

3. Suppose Fuzzy, a quantum-mechanical duck, lives in a world in which $h = 2\pi$ J·s. Fuzzy has a mass of 1.75 kg and is initially known to be within a pond 1.00 m wide. What is the minimum uncertainty in his speed?

- 0.134 m/s
- 0.571 m/s
- 0.875 m/s
- 0.286 m/s

4. Calculate the energy of a photon of wavelength 710 nm

- 75 eV
- 1.75 eV
- 2.5 eV
- 5.0 eV

5. A pulsed ruby laser emits light at 694.3 nm. For a 13.6 ps pulse containing 3.40 J of energy, find the number of photons in the pulse.

- 1.2×10^{19}
- 9.1×10^{21}
- 1.9×10^{12}
- 2.1×10^{91}