Year 13 Science: Modern physics: photons, energy levels and the nucleus

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Find the energy in joules of a 450 nm photon. Use $h = 6.63 \times 10^{-34}$ J s and $c = 3.00 \times 10^{8}$ m s^{-1}.

2. Give that energy in electronvolts.

3. Those photons fall on a metal with a work function of 2.10 eV. Find the electrons' maximum kinetic energy in eV.

4. An electron in hydrogen falls from n = 4 to n = 2. Find the photon energy in eV.

5. The deuterium nucleus has a mass defect of 0.002388 u. Find its binding energy in MeV, using 1 u = 931.5 MeV.

Fix the mistake

6. Correct this statement: "Brighter light gives the photoelectrons more kinetic energy."

7. Correct this statement: "$E_k = 6.63 \times 10^{-19} - 2.28 = 6.63 \times 10^{-19}$ J."

8. Correct this statement: "The electron drops from n = 3 to n = 2, so the photon has 13.6 ÷ 3 – 13.6 ÷ 2 eV."

9. Correct this statement: "Fission releases energy because the nucleus has extra energy stored in it."