Quiz #7: Pratt's lecture, April 12, 2002

Useful stuff: $E_n = \dfrac{-13.6\,\text{eV}}{n^2}$, $hc = 1.24\times10^{-6}\,(\text{eV})\cdot\text{m}$

1. In hydrogen, when an electron jumps from the $n = 2$ to $n = 1$ state, what is the wavelength of the emitted photon?

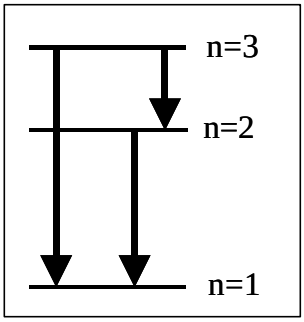
   (a) **<u>122 nm</u>**
   (b) 139 nm
   (c) 156 nm
   (d) 173 nm
   (e) 190 nm

$$E_{\text{photon}} = 13.6\,\text{eV}\left(\frac{1}{1^2}-\frac{1}{2^2}\right) = 10.2\,\text{eV}$$

$$l = \frac{hc}{E_{\text{photon}}} = \frac{1.24\times10^{-6}\ \text{eV}\cdot\text{m}}{10.2\,\text{eV}} = 122\,\text{nm}$$

2. In hydrogen, an electron is initially in the $n = 3$ state. Eventually the electron ends up in the $n = 1$ state. How many photons of different energies could be emitted?

   (a) 2
   (b) **<u>3</u>**
   (c) 4
   (d) 5
   (e) 6



There are three photons