Solution

An electron, initially excited to the n = 3 energy level of the hydrogen atom, falls to the n = 2 level, emitting a photon in the process.
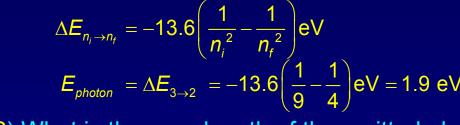
1) What is the energy of the emitted photon?

a) 1.5 eV   b) 1.9 eV   c) 3.4 eV

$$E_n = \frac{-13.6 \text{ eV}}{n^2}$$

$$\Delta E_{n_i \to n_f} = -13.6\left(\frac{1}{n_i^2} - \frac{1}{n_f^2}\right) \text{eV}$$

$$E_{photon} = \Delta E_{3 \to 2} = -13.6\left(\frac{1}{9} - \frac{1}{4}\right) \text{eV} = 1.9 \text{ eV}$$

2) What is the wavelength of the emitted photon?

a) 827 nm   b) 656 nm   c) 365 nm

E
0

n = 3
n = 2

n = 1

-15 eV