

ASTRONOMY 020

Problem Set #7

Due: November 7, 2003

1. Zeilik & Gregory, Chapter 8, problem 5.
2. Singly ionized helium, known as He II, is observed to have an emission line at 468.6 nm. Determine the electronic transition responsible for this emission line. (Hint: He II has a single electron, so look at the generalized energy level formula that we applied to the hydrogen atom.)
3. Zeilik & Gregory, Chapter 8, problem 15.

Practice problems:

1. Calculate the wavelength and energy (in eV) of a Lyman continuum photon, that is, a photon which can ionize an H atom with its electron in the ground state.
Answers: $\lambda = 91.2$ nm, $E = 13.6$ eV.
2. Determine the wavelength and frequency of the second Balmer transition, Balmer β , usually referred to as H β .
Answers: $\lambda = 486.3$ nm, $\nu = 6.169 \times 10^{14}$ Hz.