

Hand in your solutions by 5pm on Friday, November 17. You should put them in the lower box outside my office.

As always, neatness and clarity are important; state the governing equation before plugging in numbers or otherwise manipulating it; show your work; give explanations; use sketches when appropriate; express your answer including units.

Problem 1

Ryden & Peterson problem 16.7 (p. 392).

Problem 2

Ryden & Peterson problem 16.9 (p. 392). For part (d), think about information about the *rate* at which excited electrons spontaneously deexcite can be used to relate an excited state population to a rate at which photons are emitted.

Problem 3

Think back a few weeks, when we read about and discussed image formation. Given that our camera at the Peter van de Kamp Observatory has a field of view of 26.6 arc minutes, which corresponds to 4096 pixels (recall, we usually bin the pixels in 2-by-2 squares so the digital images we work with in lab have 2048 pixels on a side), what are the focal length and focal ratio of the observatory's 24-inch telescope? It might be helpful to know that the camera's pixels are 9 microns on a side.

For full credit, show your work and state what the relevant quantities mean. You should show along the way what the size of the detector is, for example.

Problem 4

Ryden & Peterson problem 17.1 (p. 407).

Problem 5

Ryden & Peterson problem 17.3 (p. 407), but only parts b and c.