

# Modern Physics (PHY 3305) Lecture Notes

## HomeworkAssignment008

SteveSekula, 1 April 2010 (created 23 March 2010)

Expectations for the quality of your handed-in homework are available at <http://www.physics.smu.edu/sekula/phy3305/homework.pdf>. Failure to meet these guidelines will result in loss of points as detailed in that document. This assignment covers material from Harris Ch. 10.1-10.9. It is worth 100 points.

no tags

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HARRIS [CH10-10](#) (10 Points)

HARRIS [CH10-14](#) (10 Points)

HARRIS [CH10-17](#) (10 Points)

HARRIS [CH10-21](#) (10 Points)

HARRIS [CH10-48](#) (15 Points)

HARRIS [CH10-50](#) (20 Points)

HARRIS [CH10-52](#) and [SS-11](#) (25 Points)

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**Problem [SS-11](#)** (worth 10 of the 25 Points awarded jointly to [CH10-52](#) and this problem)

As a "final part" of Harris [CH10-52](#), explain:

1. Gold has one conduction electron and appears yellow-orange to our eyes, which means gold is very good at absorbing and re-emitting red, orange, and yellow light, but is not good at absorbing and re-emitting green, blue, or violet light. Based on this, estimate the band gap in gold. *HINT: a cut-off in which wavelengths are most readily re-emitted suggests that photon energies*



*above yellow cause electrons to enter a state from which they can return only by emitting a well-defined photon.*

- a. Based on your understanding of the answer to Part 1, explain whether the band gap in copper (which also has one conduction electron but appears more orange in color than gold) is larger or smaller than in gold.*

