

PHGN 462 Homework 4

1) Pollack and Stump 13.5. Note that to get a real squared quantity, you have the option of just doing the squared magnitude with the complex conjugate in the usual way.

2) Pollack and Stump 13.23.

3) Read the Wikipedia article on dielectric mirrors, mirrors that work via principles of constructive and destructive interference using thin films. Feel free to follow up on links therein if you find them interesting. Then read the article on ellipsometry, which is a little bit more advanced and involves both polarization and phase. There's a lot of stuff here, so write up a paragraph or two regarding what you personally found interesting in the articles. Answers will vary a lot.

Also check out the dielectric mirrors offered by my personal favorite optics supplier, Thorlabs.

http://www.thorlabs.us/NewGroupPage9.cfm?ObjectGroup_ID=139&gclid=CNbTvs6_57ECFSIbQgodrTEACw

The above link leads to a page full of reflectivity vs. wavelength graphs demonstrating just what these mirrors can do. You can make a mirror to reflect just about anything, while also transmitting just about anything else. This comes in handy in laser optics, when you want to pass a laser beam of one color and reflect one of a different color.

4) Pollack and Stump 13.9. You may take the dispersion relation from 13.76 as given. Also, you may assume the conductor is not significantly magnetic. It's largely done in the book for you; it just wants you to go through the steps yourself and fill in the gaps.