Final exam preparation

The exam will consist of 8 problems covering the whole course. The level of the problems will be comparable to the midterm problems. Expect to see different concepts mixed within a problem.

Bring a calculator (you cannot use your phone, sorry), and possibly a ruler and pencil/eraser.

The test is closed books, but you should prepare one letter-size sheet of paper on which you can put any information you may need for the exam. You are welcome to use your midterm cards if they work well for you, but it may still be useful to go through the lecture material and identifying critical pieces of information is an important part of test preparation.

Topics covered on the exam:

1. Reflection, refraction, Snell's law, Total internal reflection
2. Graphical formation of images with positive/negative lenses, principal rays, virtual and real images
3. Lens formular, calculation of image position, magnification, system of lenses
4. Light polarization, polarizers, Malus law
5. Electromagnetic waves, basic parameters
6. Interference of waves, conditions for constructive and destructive interference
7. Two-slit interference, diffraction gratings
8. Thin film interference, interference at wedged surfaces
9. Single slit diffraction, diffraction-limited resolution, Rayleigh criteria
10. Atomic spectroscopy basics: finding optical resonance frequency using known energy level structure
11. Concept of photon as light particle, relations between electromagnetic wave and photon parameters
12. Nonlinear optical processes, frequency conversion
13. Quantum superpositions, probabilities of measurement outcomes.