

Advanced Optics Final Exam Study List - Spring 2007

What polarization does Brewster's law apply to?
Kerr cell, Pockels cell, Acoustooptic Modulator, Faraday Effect, Fresnel Rhomb
5 Seidel Aberrations (name and nature of each distortion)
Why are there no first or second-order aberrations?
Approximate shapes and orientations of lenses for minimum spherical aberration
What is an achromatic doublet? What are the physical principles that allow you to build one?
What is myopia? Hyperopia? Presbyopia? Astigmatism?
What is the range of visible wavelengths?
What is convolution? What is the convolution theorem?
Boundary conditions that lead to Fresnel laws
Meaning of TM and TE
Phase shifts on external reflections
Relationship between coherence time and coherence length
Meaning of p, q, z in Fresnel rectangular aperture diffraction
What is a Fresnel zone?
Homo- and Inhomogeneous broadening
Pressure, Lifetime, Doppler broadening
What is dichroism?
What is an e-ray? An o-ray?
What is a bolometer? Thermistor? Thermocouple?
How does a PMT work? How does a photodiode work? An APD?
How does a Liquid Crystal display work?
What is "phase matching" in NLO? What is quasi phase matching?
What is the "Nyquist frequency"
Which non-linear effects can occur in a centrosymmetric medium?
How does an optical isolator work?
How do arrange laser beams to make a phase conjugate mirror?
Why are there three different equations for gain coefficient on the eqn sheet??
Can a two-level system lase when optically pumped?
How do rate constants (qualitatively) affect population inversion?
Why does gain saturate?
What does "mode-locking" mean? Q-switching?
What determines the pulse duration of each? The rep rate?
What is a gas atomic laser? Gas molecular laser? Excimer laser? Dye laser? Solid state laser? Dye laser?
Where are Gaussian wavefronts planar? Is the wave a plane wave there? Why not?
Why are Gaussian beams a mode of a cavities with spherical mirrors?