Study Guide: Physical Optics

1. Describe a wave front.
2. Describe the relationship between light rays and wave fronts.
3. Define phase angle and its relationship to a wave front.
4. State the principle of superposition.
5. State Huygens' principle.
6. State the conditions required for producing interference patterns.
7. Define constructive and destructive interference.
8. Describe a laboratory setup designed to produce a double-slit interference pattern.
9. State the conditions for an automatic phase shift of 180^0 at an interface between two optical media.
10. Describe how diffraction differs from interference.
11. Describe single-slit diffraction.
12. Distinguish between Fraunhofer (far-field) and Fresnel (near-field) diffraction.
13. Sketch typical Fraunhofer diffraction patterns for a single slit, circular aperture, and rectangular aperture.
14. Describe a transmission grating.
15. Describe what is meant by diffraction-limited optics.
16. Describe how polarizers/analyzers and the Law of Malus are used to control light intensity.
17. Describe how Brewster windows are used in a laser cavity to produce a linearly polarized laser beam.