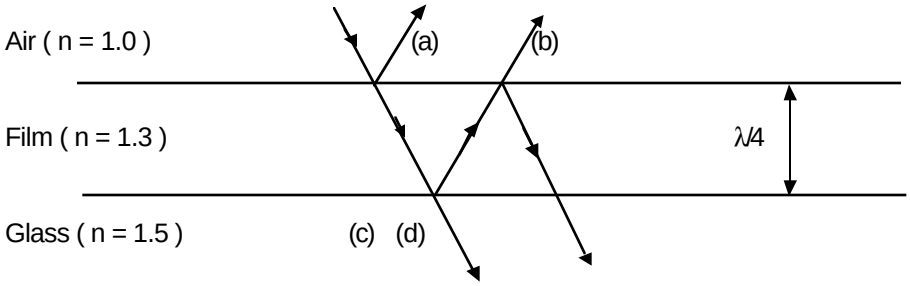
Physics: Thin Films Name: _____ Date: _____ Period: _____

1. What is the wavelength in a film (whose index of refraction of 1.3) of green light whose wavelength in a vacuum is 5200 Angstroms?

2. Several different materials might be used to make thin films 1/4 thick for red light at 6400 Angstroms. Will all these films have the same thickness? Explain.

3. Consider the figure below, which might represent a "coated" camera or binocular lens:



(a) What is the path difference between the reflected rays (a) and (b)?

(b) What is the path difference between the transmitted rays (c) and (d)?

(c) How many times are the reflected rays inverted?

(d) How many times are the transmitted rays inverted

(e) What is the "net effect" on the reflected rays?

(f) What is the "net effect" on the transmitted rays?

4. Lenses are often coated with a thin film to reduce the intensity of reflected light, and hence increase the intensity of transmitted light.

(a) If the index of refraction of the coating is 1.4, what is the smallest thickness that will give a minimum reflection of yellow light of wavelength 5600 Angstroms in air?

(b) Such lenses show a faint purple color by reflected light (try looking at a coated lens to verify this). Why?