1. Interference of light is evidence that:
   A) the speed of light is very large
   B) light is a transverse wave
   C) light is electromagnetic in character
   D) light is a wave phenomenon
   E) light does not obey conservation of energy


2. The reason there are two slits, rather than one, in a Young's experiment is:
   A) to increase the intensity
   B) one slit is for frequency, the other for wavelength
   C) to create a path length difference
   D) one slit is for E fields, the other is for B fields
   E) two slits in parallel offer less resistance

3. Light from a small region of an ordinary incandescent bulb is passed through a yellow filter and then serves as the source for a Young's double-slit experiment. Which of the following changes would cause the interference pattern to be more closely spaced?
   A) Use slits that are closer together
   B) Use a light source of lower intensity
   C) Use a light source of higher intensity
   D) Use a blue filter instead of a yellow filter
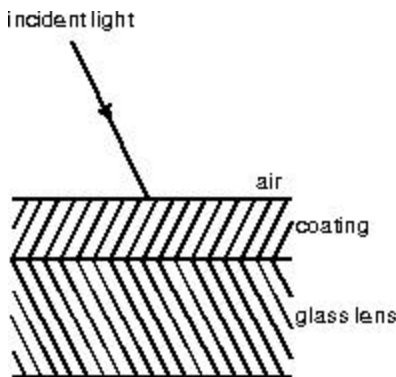   E) Move the light source further away from the slits

4. An air wedge is formed from two glass plates which are in contact at their left edges. There are ten dark bands when viewed by reflection using monochromatic light. The left edge of the top plate is now slowly lifted until the plates are parallel. During this process:
   A) the dark bands crowd toward the right edge
   B) the dark bands remain stationary
   C) the dark bands crowd toward the left edge
   D) the dark bands spread out, disappearing off the right edge
   E) the dark bands spread out, disappearing off the left edge

5. In a Young's double-slit experiment, a thin sheet of mica is placed over one of the two slits. As a result, the center of the fringe pattern (on the screen) shifts by an amount corresponding to 30 dark bands. The wavelength of the light in this experiment is 480 mm and the index of the mica is 1.60. The mica thickness is:
   A) 0.090 mm
   B) 0.012 mm
   C) 0.014 mm
   D) 0.024 mm
   E) 0.062 mm

6. Binoculars and microscopes are frequently made with "coated optics" by adding a thin layer of transparent material to the lens surface as shown. One wants:
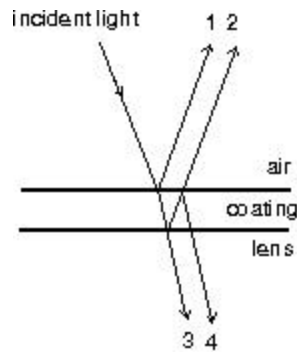
A) constructive interference between 1 and 2
B) the coating to be more transparent than the lens
C) destructive interference between 3 and 4
D) the speed of light in the coating to be less than that in the lens
E) destructive interference between 1 and 2

7. A soap film, 4×10^{-5} cm thick, is illuminated by white light normal to its surface. The index of refraction of the film is 1.50. Which wavelengths will be intensified in the reflected beam?
A) 400 nm and 600 nm
B) 480 nm and 800 nm
C) 360 nm and 533 nm
D) 400 nm and 800 nm
E) 510 nm and 720 nm

8. A lens with a refractive index of 1.5 is coated with a material of refractive index 1.2 in order to minimize reflection. If λ denotes the wavelength of the incident light in air, what is the thinnest possible such coating?

A) 0.5λ B) 0.416λ C) 0.3λ
D) 0.208λ E) 0.25λ

Answer Key --

1. D
2. C
3. D
4. E
5. D
6. E
7. B
8. D