# Physics 10164 – Summer 2016 – Exam 3

Partial credit will be given provided you show all work and are solving parts of the problem correctly. Points will be deducted if you don't show your work even if you get the right answer. Clearly indicate your answer with a circle or a box and remember to include correct units and significant figures.

#1. (25 pts) Light enters one end of a rectangular fiber-optic cable, shown below in cross-section. The index of refraction of the cable is 1.35. What is the maximum angle of incidence (A) on the left end of the cable so that the ray will remain trapped inside the cable by internal reflection?
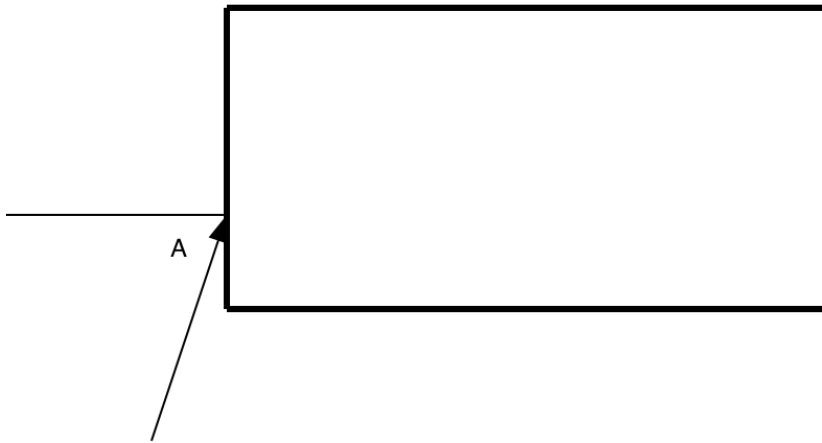
#2. (25 pts) A concave mirror forms an upright image of an object 8.0 cm away from the mirror, and the image is 1.5 times larger than the object. What is the focal length of the mirror?

#3. (25 pts) A thin anti-reflective coating (n = 1.74) is applied to a glass surface (n = 1.50). If the coating has a thickness of 490 nm, find what wavelength(s) of light in the visible part of the spectrum experience destructive interference when reflected. The visible spectrum ranges from 380-750 nm.

#4. (25 pts) The normal near point for a person is 25 cm, and the normal far point is infinity. Brock has myopia, and his near point is measured to be 21 cm while his far point is measured to be 42 cm.

(a) What is the focal length of the lenses needed to give Brock a normal far point?

(b) What is the new near point Brock experiences with these lenses?