Physics 5B **Homework Set #9** **Winter 2008**

DUE: WEDNESDAY MARCH 12, 2008

Assigned reading: Giancoli, Chapter 34, sections 4–6, Chapter 35, sections 1–6.

1. True/false questions: For each of the following statements, indicate whether the statement is true or false. Briefly explain your reasoning (for example, if false, provide a counter-example).
   (a) Consider a plane wave incident on a screen with two slits, as shown in Figure 34-6 of Giancoli. The intensity of the double-slit interference pattern is the same at the locations of the first order and second order bright fringes.
   (b) When a thin layer of oil lies on top of water, one can often see swirls of color. This phenomenon arises as a result of the dispersion due to differences in the index of refraction of the oil and water as a function of the wavelength of light.
   (c) A radio can receive a radio signal behind a hill, even if there is no direct "line of sight" between the radio and the transmitting antenna.
   (d) If the first off-center maximum of one circular diffraction pattern passes through the center of a second diffraction pattern, the two sources responsible for the pattern will appear to be a single source.
   (e) It is not possible to resolve details of objects smaller than the wavelength of the radiation being used as a probe.
   (f) Diffraction effects can occur for virtual images.

To earn full credit on the following problems, you must exhibit the steps that lead to your final results. The graded homework will be based on the clarity of your method of solution as well as on your final answer.

2. Giancoli, Chapter 34, problem 19
3. Giancoli, Chapter 34, problem 21
4. Giancoli, Chapter 34, problem 32
5. Giancoli, Chapter 34, problem 33
6. Giancoli, Chapter 34, problem 34
7. Giancoli, Chapter 35, problem 8

8. Giancoli, Chapter 35, problem 12
9. Giancoli, Chapter 35, problem 14
10. Giancoli, Chapter 35, problem 19
11. Giancoli, Chapter 35, problem 28