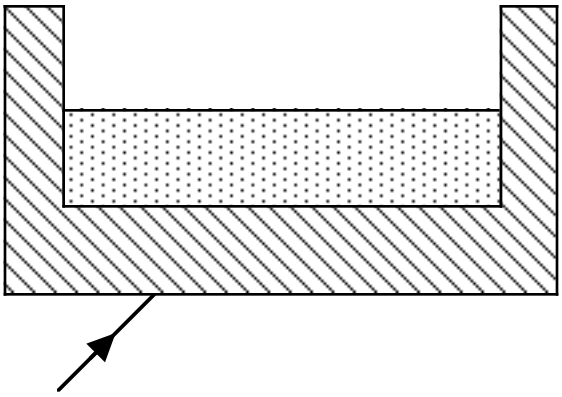
**General Physics 110 Homework Set #11 Due in class Monday, April 28, 2008**

**Chapter 34 –** Problems 9*, 26*, 39*, 40*, 47*, 59*

Remember to show your work and include units with your answers (including them in your calculations as you go along is an even better idea).

**A.** A layer of water is contained in a glass tank as shown. The index of refraction of glass is greater than that of water. A ray of light is incident at the bottom of the tank as shown.



**a)** Sketch the ray transmitted into the glass and then into the water and out of water into the air.

**b)** Now assume that the water is removed from the tank. Sketch a ray incident on the bottom of the tank as before, then transmitted in the glass and then into air instead of water. Explain the differences that exist between the rays in parts **a)** and **b)**.

**B.*** Two very narrow rays of light of different colors are incident on a glass plate at different angles. The difference in angle is exaggerated for the sake of clarity. It so happens that the two rays coalesce into one ray on entry into the glass as shown in the diagram.

**a)** Which of the two rays has the higher index of refraction in glass? Explain your reasoning.

**b)** Sketch the rays reflected from the bottom surface of the glass and emerging back into the air through the upper surface of the glass. Explain your reasoning.

**c)** Suppose the angle of incidence of rays *A* and *B* were increased without changing the angle between them. At what angle of incidence at the upper surface of the glass would a ray of either *A* or *B*, reflected from the bottom surface, undergo total internal reflection within the glass? What would simultaneously be happening to the ray of the other color? Explain your reasoning.