Physics 151 Class Exercise: Buoyancy

1. A cube of iron 0.3 m on a side is suspended (in equilibrium) from a large spring scale (which reads in Newtons) held over a giant tank of water. The center of the cube is 30 m below the surface of the water.

(a) What is the volume of the cube?

(b) What is the mass of the cube?

(c) What is the weight of the water displaced by the cube?

(d) What is the magnitude of the force of buoyancy on the cube?

(e) What is the reading on the spring scale ?

(f) What is the pressure on the top surface of the cube?

(g) What is the pressure on the bottom surface of the cube?

(h) What is the force on the top surface of the cube?

(i) What is the force on the botttom surface of the cube?

(j) What is the difference between the force on the bottom and the force on the top?

2. A piece of lead has the shape of a hockey puck, with a diameter of 7.5 cm and a height of 2.5 cm. If the puck is placed in a mercury bath it floats. How deep below the surface of the mercury is the bottom of the lead puck?

Answer:	