

Phys 10154 - Fall 2006 - Exam #9B

Be sure to answer with the proper units and significant figures. Indicate your answers clearly with boxes. **SHOW ALL WORK.** Even if your answer is correct, I will deduct points if I can't see how you solved the problem. Both problems are worth 50 points.

#1. A 2.50-kg aluminum block (density = 2120 kg/m^3) is released from the top of a 5.50-meter deep water tank that is open to the atmosphere. The block has a cross-sectional area of 43.2 cm^2 .

What is the upward-pushing force that the water exerts on the bottom of the block when the top of the block is 1.00 meters below the surface (you need to calculate the height of the block)? Answer with 6 SF.

What is the downward-pushing force that the water exerts on the top of the block when the top of the block is at a depth of 1.00 meters? Answer with 6 SF.

How many seconds after the block is released does it hit the bottom of the tank? For simplicity, just assume the distance traveled is 5.50 meters. Answer with 3 SF.

#2. A large tank is open to the air and springs a leak 2.25 meters below the surface. Water flows at a rate that fills up a 1.00 gallon jug in 15.0 seconds. What is the diameter of the hole, in millimeters?

Conversion factors are on your formula sheets.