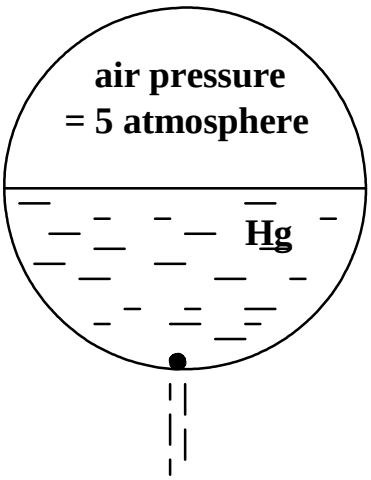
PHY 1350 002 EXAM #4 FALL 1994

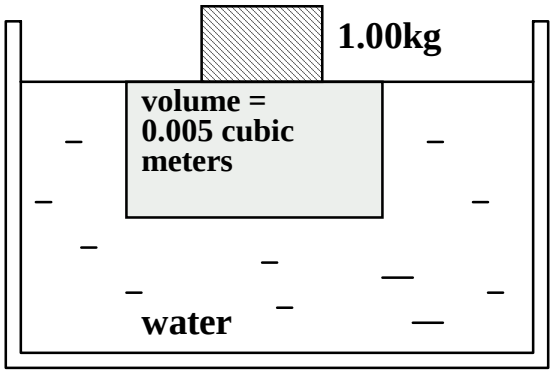


1. A hollow sphere of radius 2.00 m is half filled with mercury whose density is 13.6×10^3 kg/m^3. The air pressure above the Hg surface has a value of 5.00 atmosphere. The pressure outside the sphere is 1 atmosphere. If the mercury is spurting out of a hole of area 1mm by 1mm, at the bottom of the sphere, with what speed does it leave the opening?

2. A projectile is fired with a speed of 10,000 m/s straight up from the surface of a planet which has 1/8 the mass of the Earth and 1/2 the Earth's radius. This planet has no atmosphere. How fast will the projectile be moving when it is one planet radius above the surface of the planet?

3. A 1000 g mass is attached to a spring whose stiffness is 100 N/m. The mass moves with simple harmonic motion. The mass is observed to have a speed of 2.00 m/s when the spring stretch from equilibrium is 20.0 cm. How fast will the mass be moving when the stretch from equilibrium is 10.0 cm?

4. A block whose volume is 0.005 cubic meters is in static equilibrium when it is just submerged in water by placing a 1.00 kg block on top of it.



(a.) What is the buoyant force acting on the submerged block?

(b.) What is the mass of the submerged block?