

Answer on Question #63791-Physics-Classical Mechanics

If we take two objects mass of 1 kg and having density more than 1 such that both the bodies submerge in water. Now we take a precise balance and on one limb of the balance we take certain mass of water in a vessel and on the other limb we place the same exact mass such that the balance remains in perfect equilibrium. Now if we submerge one object of mass 1 kg on one limb of the balance and other object on the other limb then will there be any deflection in the balance? If yes then why? If no then why?

Answer

No. The force that acts on one limb of the balance depends only on total mass of water in a vessel and the object (not on the weight of the object in water which is different from the weight in the air).

$$F_1 = (M + 1) = F_2 = (M + 1)g,$$

where g is the acceleration due to the gravity.