The weight of the stand and suspended solid iron ball is equal to the weight of the container of water as shown. When the ball is lowered into the water, the balance is upset. The amount of weight that must be added to the left side to restore balance, compared with the weight of water displaced by the ball, would be

a) half.
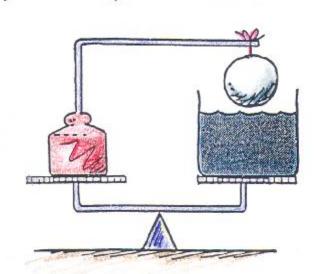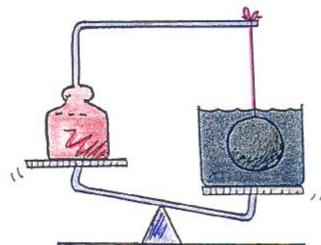b) the same.
c) twice.
d) more than twice.

Next-Time Question

The weight of the stand and suspended solid iron ball is equal to the weight of the container of water as shown. When the ball is lowered into the water, the balance is upset. The amount of weight that must be added to the left side to restore balance, compared with the weight of water displaced by the ball, would be
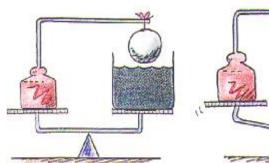

a) half.
b) the same.
c) twice.
d) more than twice.

Answer: c, twice

The additional weight that must be put on the left side to restore balance will equal twice the buoyant force, that is, twice the weight of water displaced by the submerged ball. Why twice? Because what the right side gains due to submersion and the heightened water level, the left side loses.

(For example, if each side initially weighs 10 N and the right side gains 2 N to become 12 N, the left side loses 2 N to become 8 N. So an additional weight of 4 N, not 2 N, is required on the left side to restore balance.)

Hewitt Drew it!

CONCEPTUAL Physics