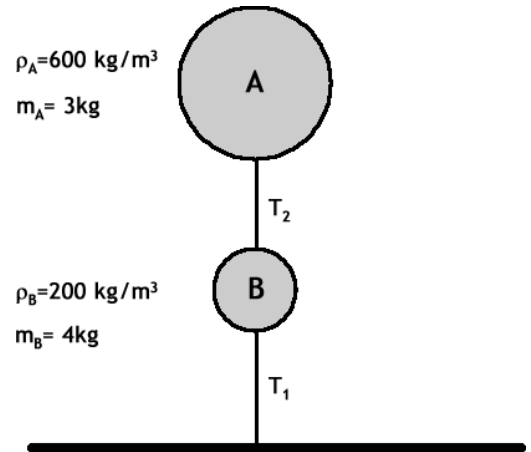


Two spheres are completely submerged in water ($\rho = 1000 \text{ kg/m}^3$) and connected to each other by a light weight, thin string. The lower sphere is connected to the bottom of the vessel by the same light weight, thin string.

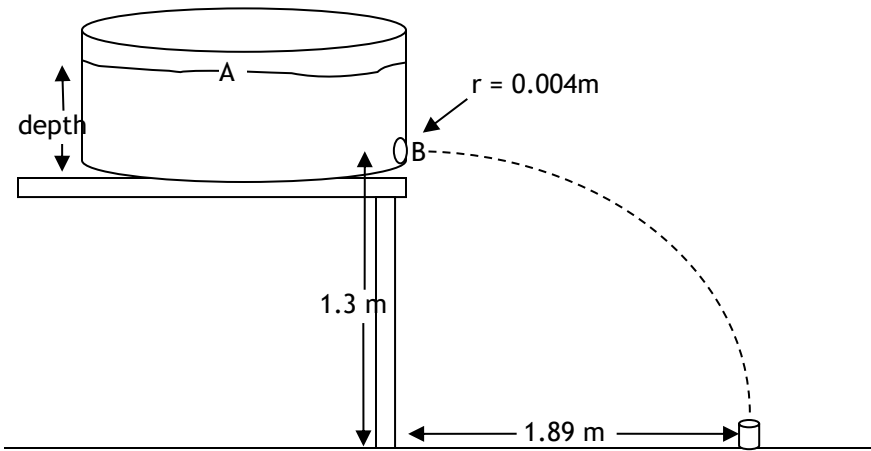
a) Draw a free body diagram for sphere B.



b) Determine the radius of sphere B?

c) Determine the tension in both strings.

d) If T_2 is cut, determine the initial upward acceleration of sphere A.



A bucket of very large radius is filled to a certain depth and set up on a table 1.3 m high. A hole at the bottom of the bucket, radius 0.004 m, is unplugged, causing a stream of water to shoot out and land in a cup 1.89 meters away.

a) How fast is the water moving at point B, just outside the opening at the bottom of the bucket?

b) How fast is the water moving at point A

c) What is the depth of the water in the bucket when the cork is pulled?

d) How much time would it take to fill the cup if it's volume is $5.65 \times 10^{-4} \text{ m}^3$?