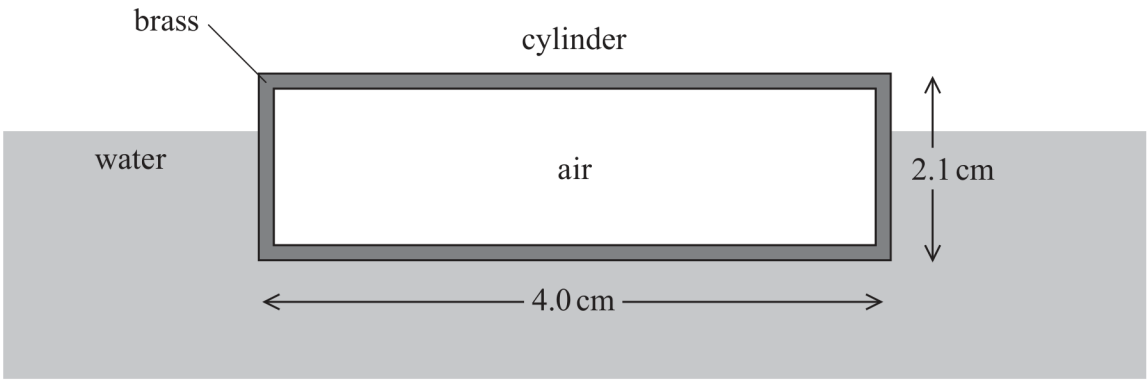
15 A hollow brass cylinder with closed ends is floating on the surface of water.

The cylinder has a length of 4.0 cm and an external diameter of 2.1 cm as shown.



63% of the volume of the cylinder is submerged. The cylinder contains negligible weight of air.

(a) Explain why the brass cylinder floats.

(2)

(b) The density of water is $1.0 \times 10^{3}\,\text{kg}\,\text{m}^{-3}$

(i) Show that the mass of the cylinder is about $9 \times 10^{-3}\,\text{kg}$.

(4)

(ii) Deduce whether an identical hollow cylinder made of gold would also float.
Assume that the volume of gold is the same as the volume of brass.

density of gold = $19.3 \times 10^3\,\text{kg}\,\text{m}^{-3}$
density of brass = $8.7 \times 10^3\,\text{kg}\,\text{m}^{-3}$

(4)

(Total for Question 15 = 10 marks)