1 Fig. 2.1 shows a hollow metal cylinder containing air, floating in the sea.

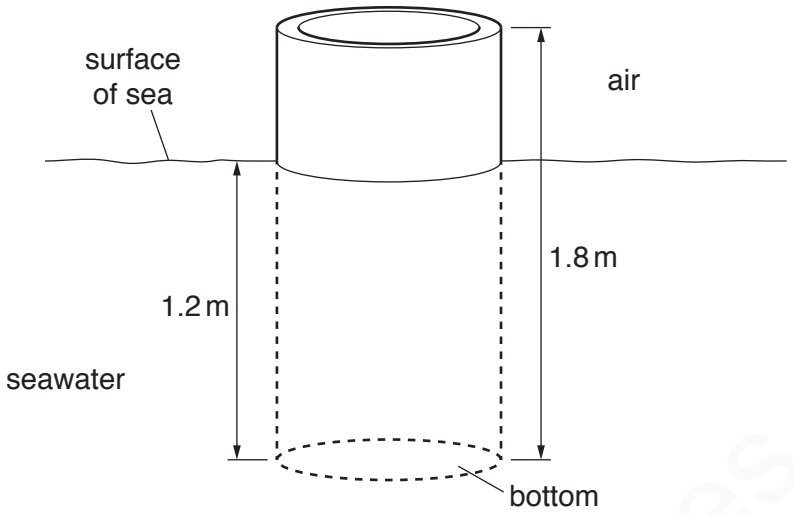

Fig. 2.1

(a) The density of the metal used to make the cylinder is greater than the density of seawater.

Explain why the cylinder floats.

.....

.....[1]

(b) The cylinder has a length of 1.8 m. It floats with 1.2 m submerged in the sea. The bottom of the cylinder has an area of cross-section of 0.80 m^2.

The density of seawater is 1020 kg/m^3. Calculate the force exerted on the bottom of the cylinder due to the depth of the seawater.

force = ...[4]

(c) Deduce the weight of the cylinder. Explain your answer.

weight = ...

explanation .....

.....

[2]

[Total: 7]

MARKING SCHEME:

(a)	average/overall/combined density (of the metal and air contained) less (than density of sea water)	**1**
(b)	(P =) $h \times \rho \times g$ **OR** (V=) $A \times l$ in any form	**1**
	(P= 1.2 × 1020 × 10 =) 12 000 (Pa) **OR** (V= 0.8 × 1.2 =) 0.96 (m^3)	**1**
	$P = F \div A$ **OR** (F =) $P \times A$ **OR** (W =) $V \times \rho \times g$	**1**
	(F = 12240 × 0.80 =) 9800 N **OR** (F = W =) 9800 N	**1**
(c)	same numerical answer as **(b)**	**1**
	resultant/net (vertical) force = 0 **OR** downward force = upward force **OR** forces are balanced	**1**