4 **(a)** **(i)** A rectangular glass tank contains 3.0 m^3 of liquid. The mass of the liquid is 2800 kg. Calculate the density of the liquid.

density = ... [1]

(ii) A metal block is placed in the tank and it sinks to the bottom. The top surface of the block is 1.1 m below the surface of the liquid.

Fig. 4.1 shows the block on the bottom of the tank.

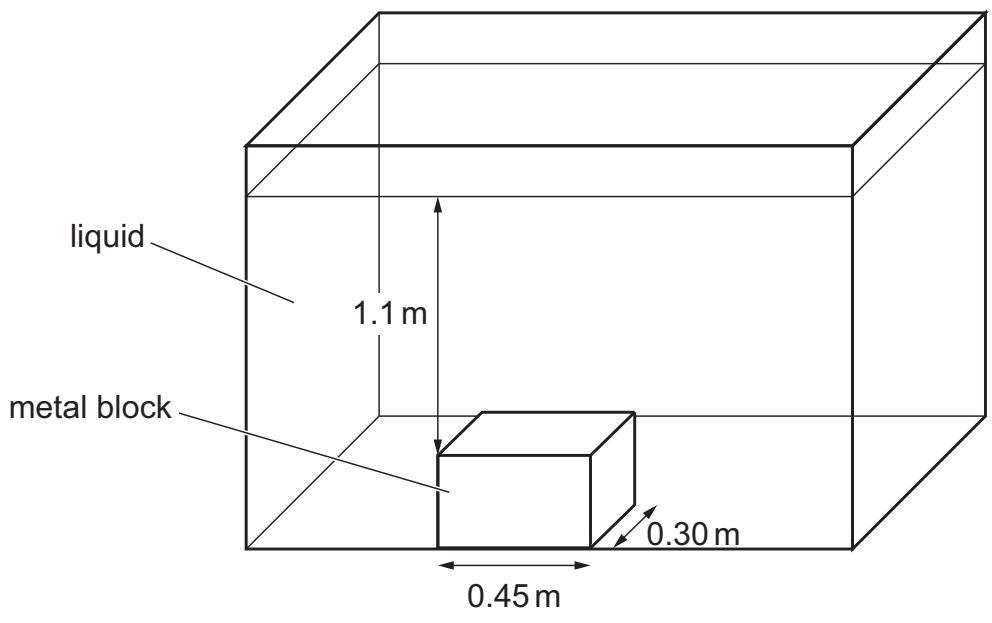

Fig. 4.1

Calculate the force exerted by the liquid on the top of the block.

force on top of the block = ... [4]

(b) Fig. 4.2 shows part of a steel railway track. There are small gaps between sections of the rail.

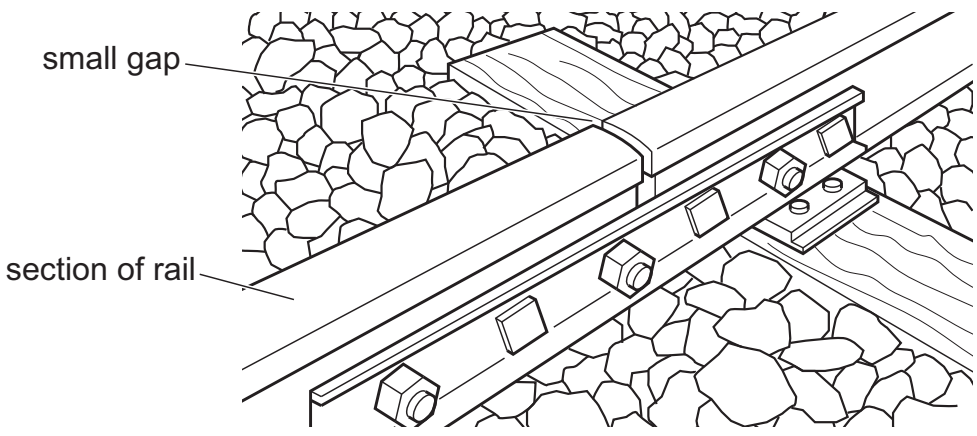

Fig. 4.2

State why gaps are needed between the sections of rail. Explain your answer in terms of particles.

statement .....

explanation .....

.....

[2]

(c) Fig. 4.3 shows a saucepan of boiling water on the heating ring of an electric cooker.

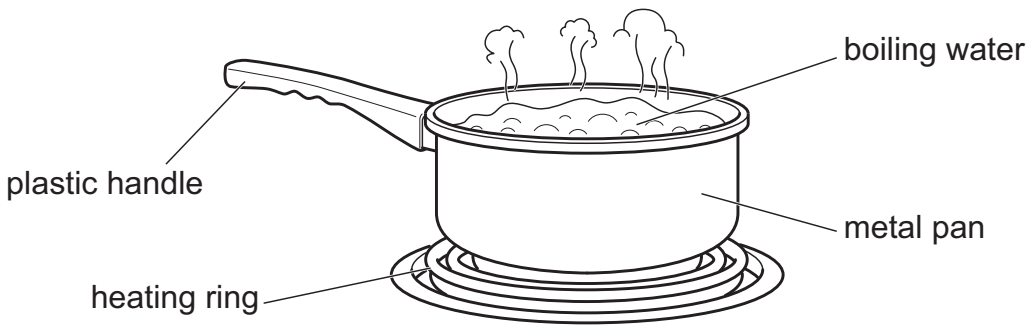

Fig. 4.3

The handle is made from plastic.
Explain why this material is suitable.

.....

.....

..... [2]

[Total: 9]