1 A scuba diver is on a sandy beach.

She checks her compressed air cylinders before a dive.
She has two identical steel cylinders, A and B.
Each cylinder contains the same amount of compressed air.

Figure 25 shows the diver's cylinders.

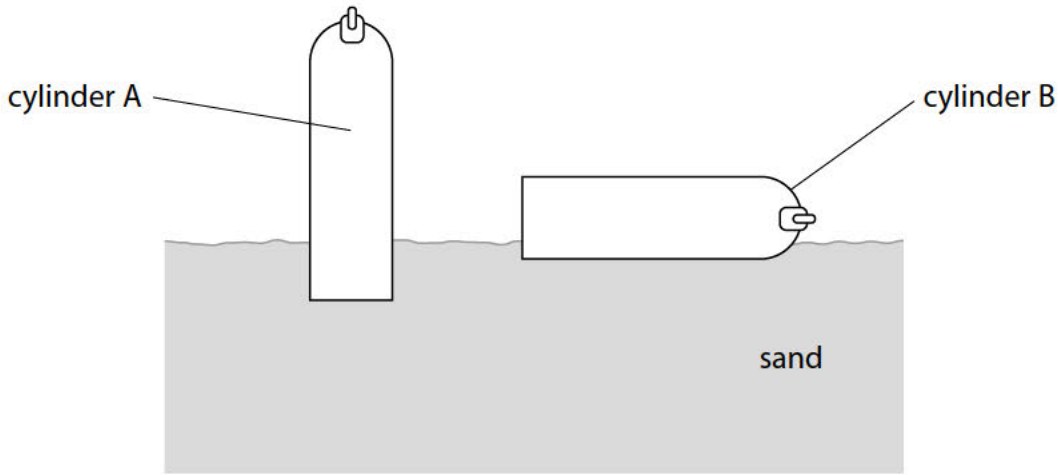


Figure 25

(a) Explain why cylinder A sinks further into the sand than cylinder B.

Use ideas about pressure, force and area in your answer.

(4)

(b) When underwater, the diver tries to move a large stone block.

The diver uses a long iron bar and a pivot, as shown in Figure 26.

When pushing down with a force of 120 N, the block is balanced.

Not to scale

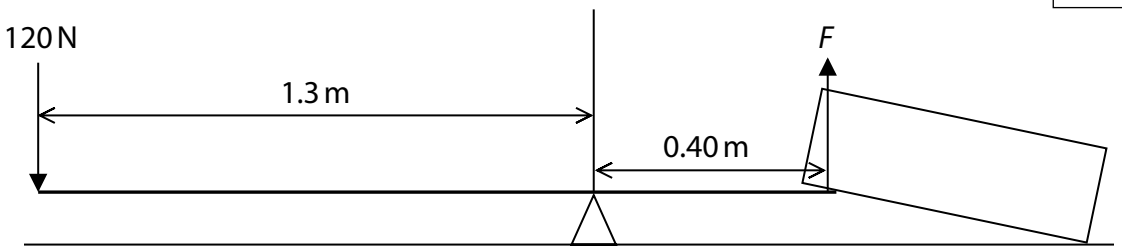


Figure 26

Calculate the size of the force, *F*, of the bar on the block.

(3)

force = ... N

*(c) When the diver is swimming under water, she breathes out bubbles of gas, as shown in Figure 27.



(Source: © mihtiander/123RF)

Figure 27

The bubbles of gas rise to the surface.
The temperature of the gas does not change.

Explain what happens to a bubble as it rises to the surface.
Your answer should refer to gas equations, kinetic theory and particles.

(6)

(Total for Question 10 = 13 marks)