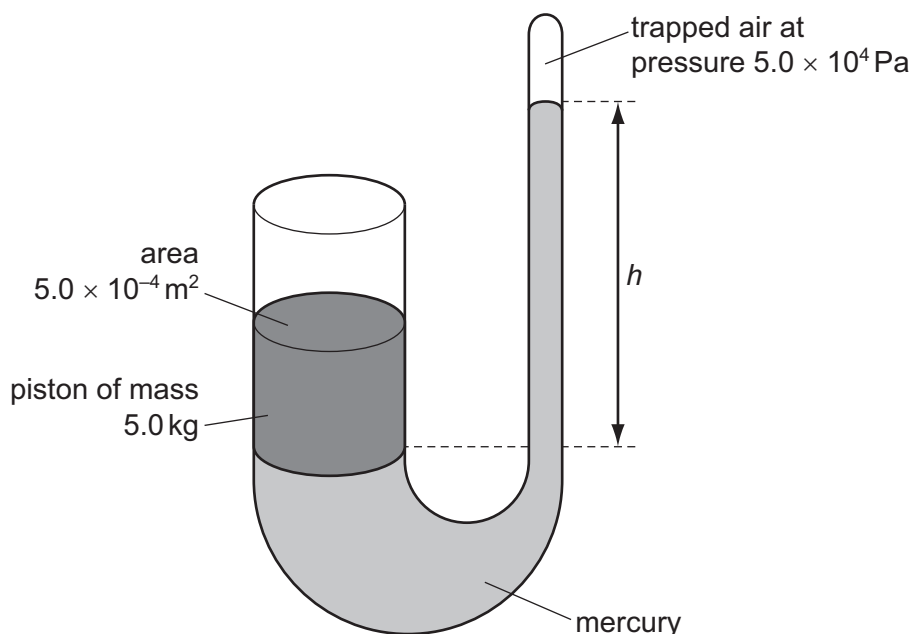


- 19** A U-tube closed at one end contains mercury. Air at a pressure of $5.0 \times 10^4 \text{ Pa}$ is trapped at the closed end. The other end is open to the atmosphere and is fitted with a piston of mass 5.0 kg and cross-sectional area $5.0 \times 10^{-4} \text{ m}^2$.

The density of mercury is $13\,600 \text{ kg m}^{-3}$ and atmospheric pressure is $1.01 \times 10^5 \text{ Pa}$.



What is the height h of the mercury column?

- A** 37 cm **B** 44 cm **C** 74 cm **D** 110 cm
- 20** A known tensile force acts on a wire. The wire does not exceed its elastic limit.
- Which two measurements enable the strain of the wire to be calculated?
- A** the unstretched length of the wire and the cross-sectional area of the wire
B the unstretched length of the wire and the extension of the wire
C the Young modulus of the wire's material and the extension of the wire
D the Young modulus of the wire's material and the unstretched length of the wire
- 21** The Young modulus of steel is determined using a length of steel wire and is found to have the value E .

Another experiment is carried out using a wire of the same steel, but of half the length and half the diameter.

Which value is obtained for the Young modulus in the second experiment?

- A** $\frac{1}{2}E$ **B** E **C** $2E$ **D** $4E$