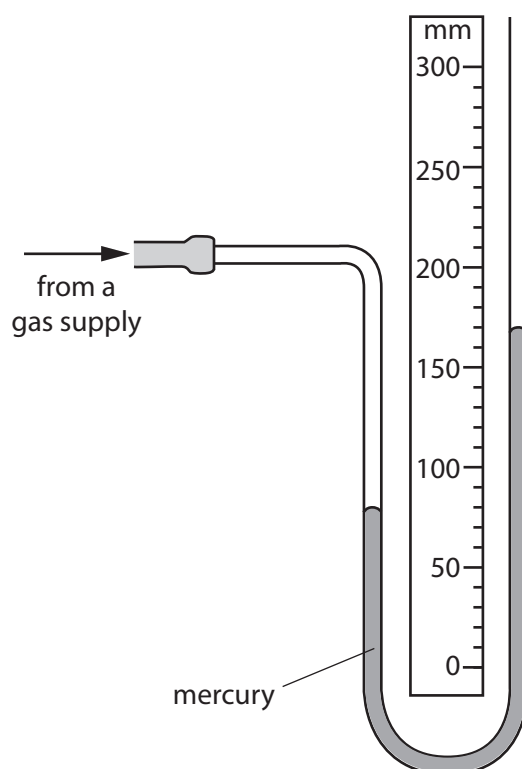


- 1 A mercury manometer is connected to a gas supply, as shown in the figure.



The gas supply is then turned off. The rubber tube connecting the manometer to the gas supply is disconnected, so that both ends of the manometer are open to the atmosphere.

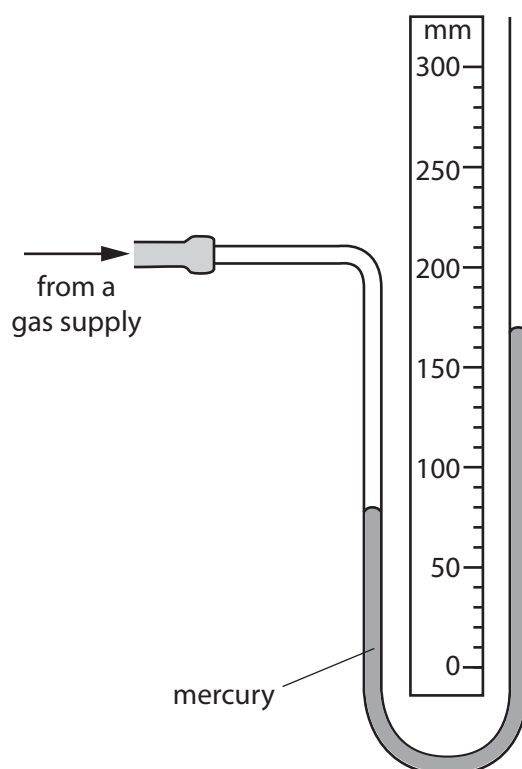
What are the readings of the mercury levels in each column?

left-hand column reading = mm

right-hand column reading = mm [2]

[Total: 2]

- 2 A mercury manometer is connected to a gas supply, as shown in the figure.



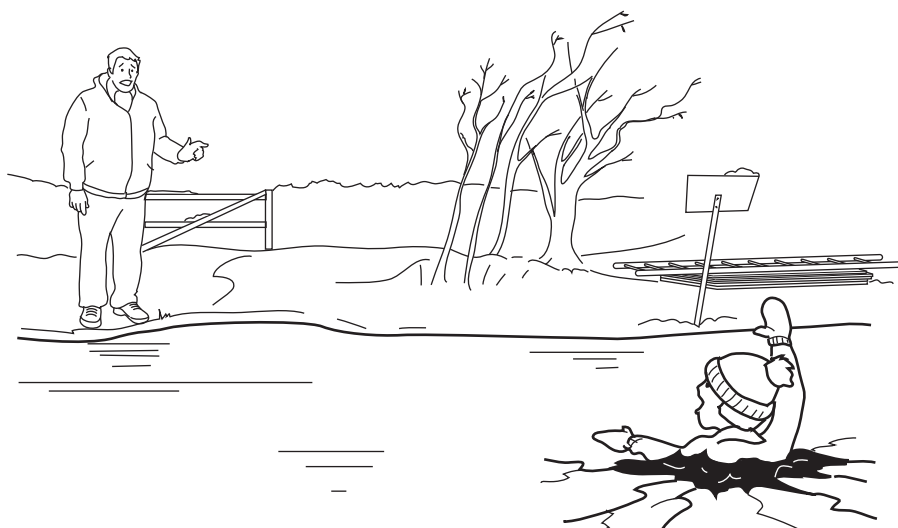
Suggest why water could not be used in this manometer to measure the gas pressure from the supply.

.....
.....

[1]

[Total: 1]

- 3 A young boy, skating on a frozen pond, has fallen through some thin ice about 10 m from the shore of the pond. The figure shows the situation.



A man, standing near the pond, hears the boy's shouts for help.

The man weighs more than the boy.

(a) Why would it be unsafe for the man to walk on the ice to rescue the boy?

.....
 [1]

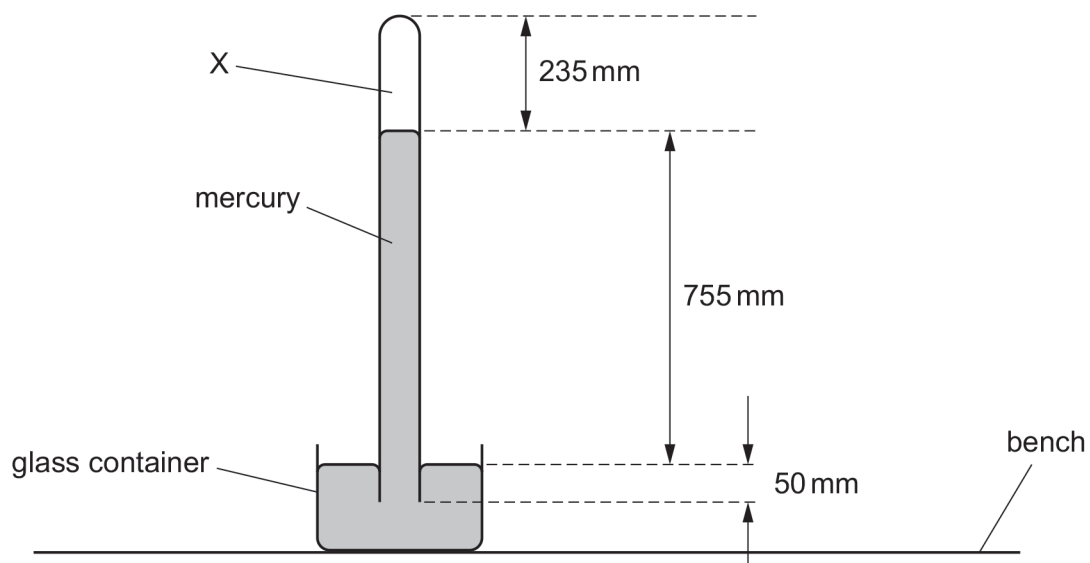
(b) Suggest and explain what the man could do to cross the ice to reach the boy safely.

.....

 [4]

[Total: 5]

4 The diagram shows a mercury barometer.



(a) Determine the atmospheric pressure indicated by the barometer. Include the unit.

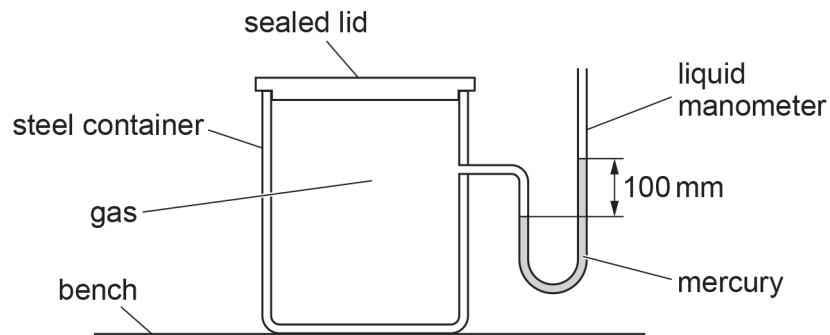
atmospheric pressure = unit [2]

(b) State what is in the space labelled X above the mercury in the tube.

..... [1]

[Total: 3]

- 5 The diagram shows a steel container fitted with a liquid manometer. There is a gas in the container.



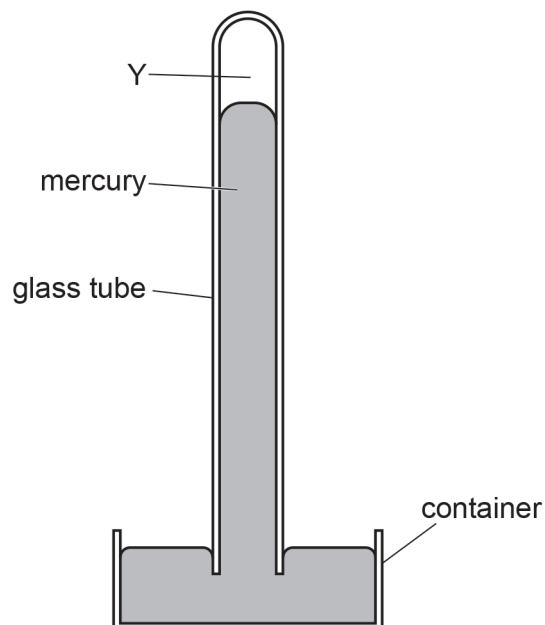
Atmospheric pressure is equal to 760 mm of mercury (mm Hg).

Determine the pressure inside the container in mm Hg.

pressure = mm Hg [2]

[Total: 2]

- 6 The diagram shows a mercury barometer.



- (a) State what is in the space at Y above the mercury.

..... [1]

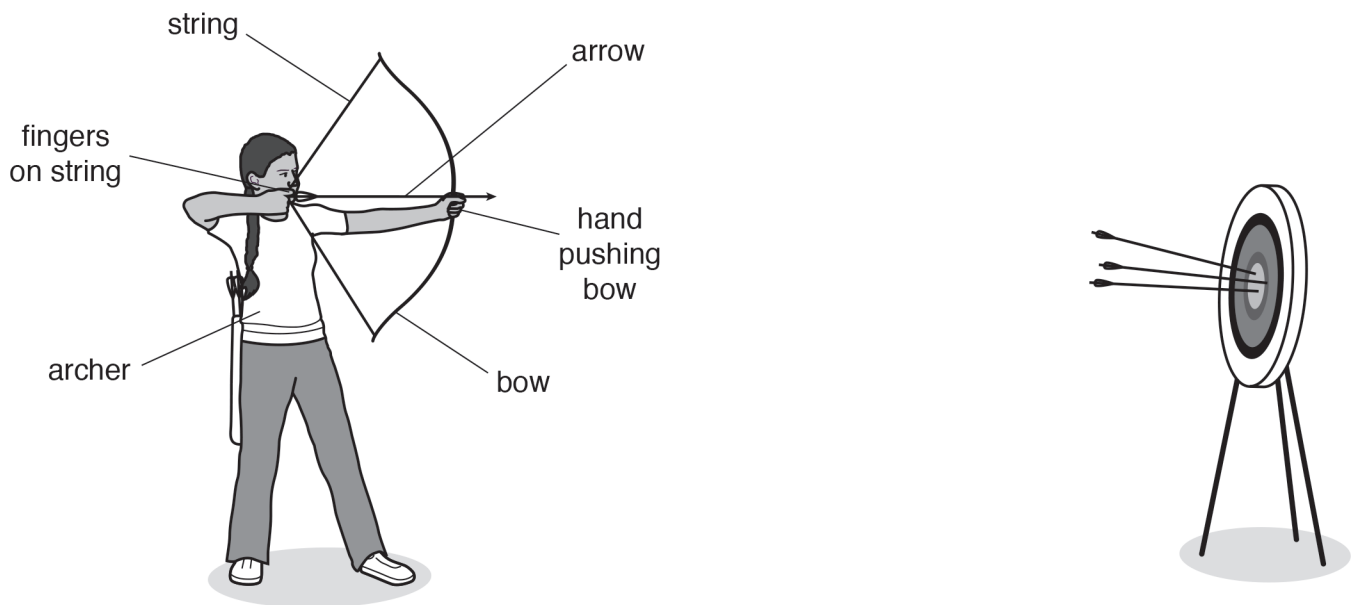
- (b) Complete the following statement to describe the use of a mercury barometer.

A mercury barometer measures

..... [2]

[Total: 3]

- 7 The diagram shows an archer pulling the string of a bow.



- (a) The archer uses a force of 120 N. The force acts on an area of 0.5 cm^2 on the archer's fingers.

Calculate the pressure on the archer's fingers.

pressure on fingers = N/cm^2 [3]

- (b) The archer's other hand is pushing the bow with the same force of 120 N. This force acts on a larger area than the force in (a).

State whether the pressure on this hand is greater than, the same as or less than the pressure on the fingers holding the string.

..... [1]

[Total: 4]

- 8 Skis are strapped to a skier's feet and are longer and wider than the skier's feet.

Explain how the skis prevent the skier from sinking into soft snow.

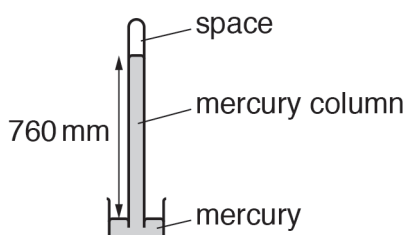
.....

.....

..... [2]

[Total: 2]

- 9 The diagram shows a simple device for measuring atmospheric pressure.



- (a) State the name given to the device shown in the diagram.

..... [1]

- (b) State what, if anything, is in the space at the top of the tube, above the mercury column.

..... [1]

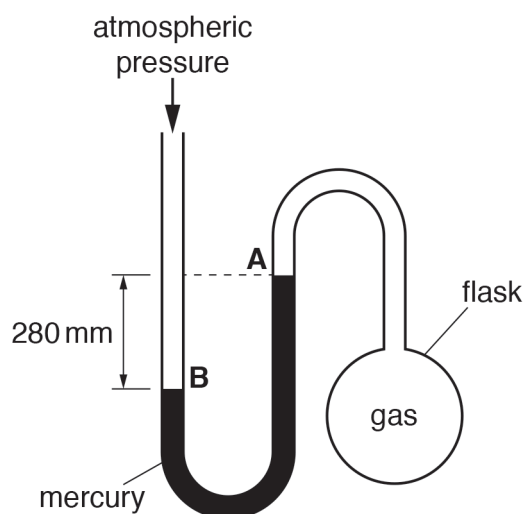
- (c) The diagram shows normal atmospheric pressure. Suggest a possible value for the height of the mercury column when atmospheric pressure decreases. Include the unit.

reading = [1]

[Total: 3]

- 10 A flask contains gas with a pressure lower than atmospheric pressure.

The diagram shows equipment being used to measure the pressure of the gas in the flask.



- (a) State the name of the equipment shown in the diagram that is used to measure the pressure of the gas.

..... [1]

- (b) The atmospheric pressure is equal to 760 mm Hg.

The distance between mercury level A and mercury level B is 280 mm.

Determine the pressure of the gas inside the flask.

pressure = mm Hg [2]

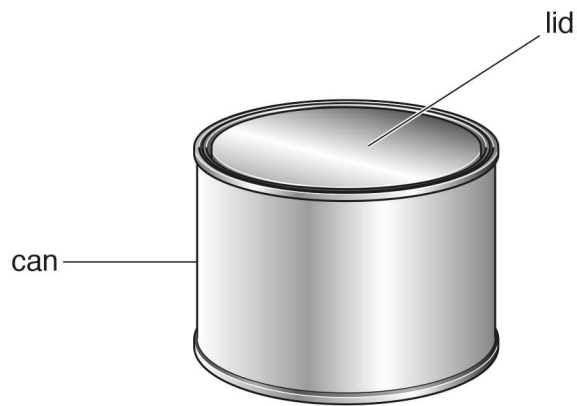
- (c) The flask is cooled. Describe the effect, if any, the cooling has on

mercury level A

mercury level B [1]

[Total: 4]

- 11 The diagram shows a metal can containing air. The can is sealed with a lid.



The air in the can exerts a pressure of $20\,000\text{ N/m}^2$ on the lid. The area of the can lid is 0.09 m^2 .

Calculate the force on the lid due to the air in the can.

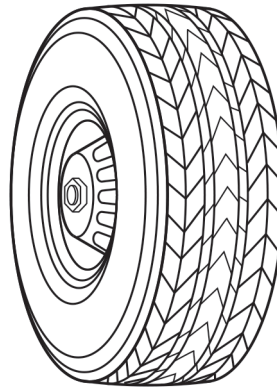
force = N [3]

[Total: 3]

- 12 A vehicle may have tyres of type **A** or type **B**, as shown in the diagram.



type A



type B

- (a) State and explain the type of tyre that is suitable for travelling over soft ground.

.....

.....

.....

..... [3]

- (b) The temperature of the air in a tyre increases. This affects the motion of the air molecules in the tyre.

Describe and explain the changes.

.....

.....

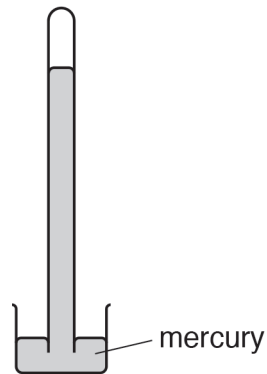
.....

.....

..... [3]

[Total: 6]

- 13 The diagram shows a device used for measuring atmospheric pressure.



State the name of the device shown in the diagram.

..... [1]

[Total: 1]

- 14** A deep-sea diver on a diving-boat experiences atmospheric pressure. When she is working underwater, she experiences an increased pressure.

State **two** factors that affect the size of the increased pressure.

1.

2. [2]

[Total: 2]

- 15** A column of liquid has height h , mass m and density ρ . The gravitational field strength is g .

Which expression gives the pressure due to the column of liquid?

A $h\rho$

B $m\rho$

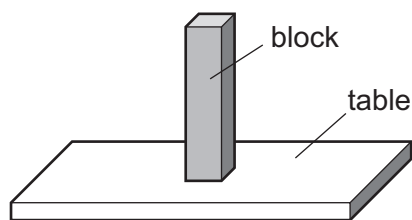
C mgh

D ρgh

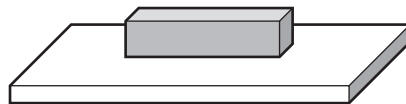
[1]

[Total: 1]

- 16** A block with flat, rectangular sides rests on a table.



The block is now turned so that it rests with its largest side on the table.



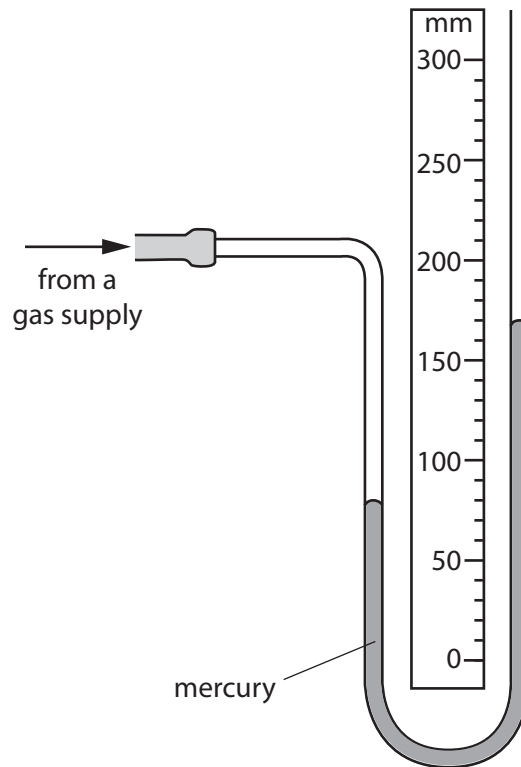
How has this change affected the force and the pressure exerted by the block on the table?

| | force | pressure |
|----------|-----------|-----------|
| A | decreased | decreased |
| B | decreased | unchanged |
| C | unchanged | decreased |
| D | unchanged | unchanged |

[1]

[Total: 1]

17 A mercury manometer is connected to a gas supply, as shown in the figure.



Is the pressure of the gas from the supply greater than or less than atmospheric pressure, and how do you know?

.....

.....

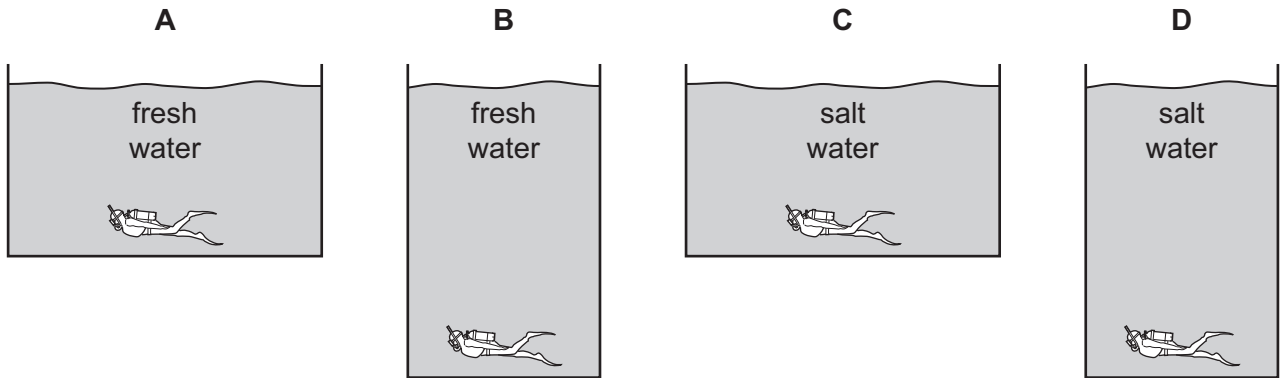
..... [1]

[Total: 1]

- 18 The diagrams show four divers at the bottom of four different swimming pools.

Two swimming pools contain fresh water and two contain salt water. Fresh water is less dense than salt water.

Which diver feels the least pressure from the water?



[1]

[Total: 1]