

**1. March/2020/Paper\_12/No.12**

Diagram 1 shows a tube sealed at one end and partly immersed in mercury. The tube has a diameter  $d$ . The top of the mercury in the tube is a height  $h$  above the mercury reservoir.

diagram 1

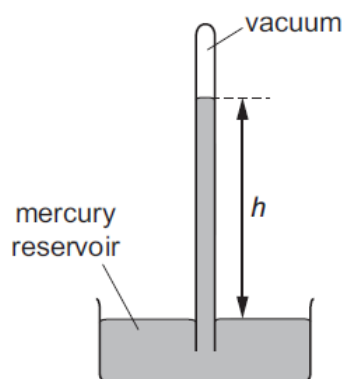
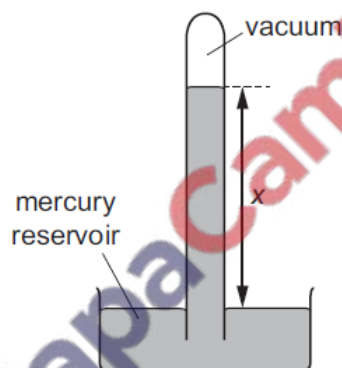


Diagram 2 shows a similar arrangement with a tube that has a diameter  $2d$ .

diagram 2



What is the relationship between  $h$  and  $x$ ?

- A  $x = 2h$
- B  $x = h$
- C  $x = \frac{h}{2}$
- D  $x = \frac{h}{4}$

2. March/2020/Paper\_12/No.13

A skier is standing still on a flat area of snow.



The weight of the skier is 550 N. The total area of his skis in contact with the ground is  $0.015 \text{ m}^2$ .

What is the pressure exerted on the ground by the skier?

- A  $0.83 \text{ N/m}^2$     B  $8.3 \text{ N/m}^2$     C  $3700 \text{ N/m}^2$     D  $37000 \text{ N/m}^2$

3. March/2020/Paper\_22/No.14

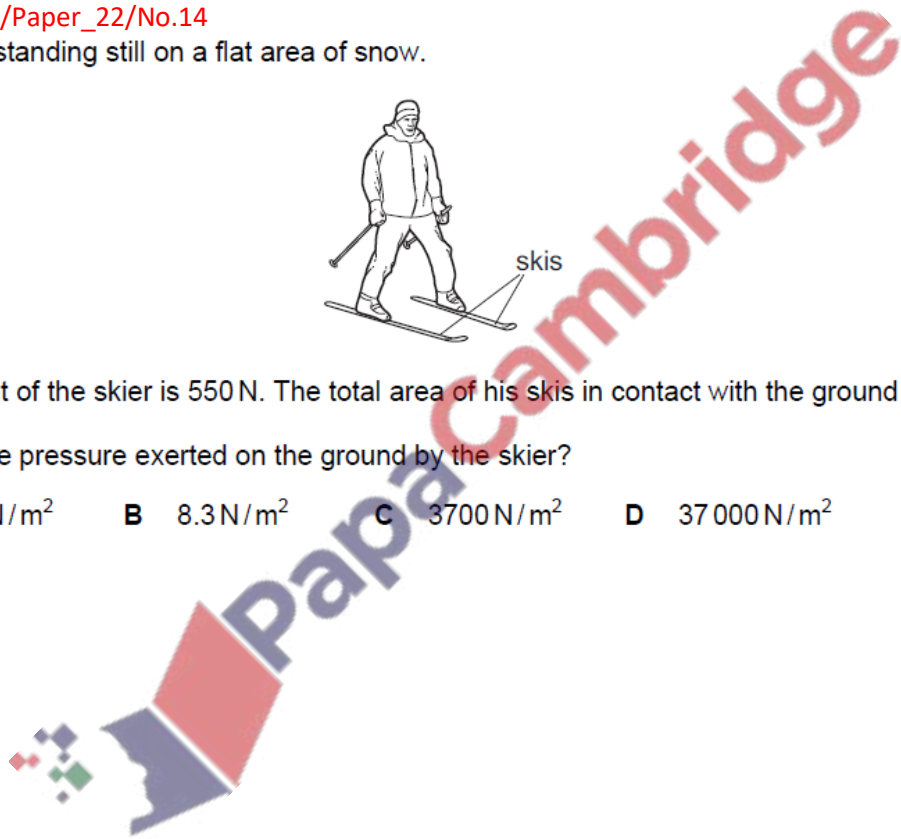
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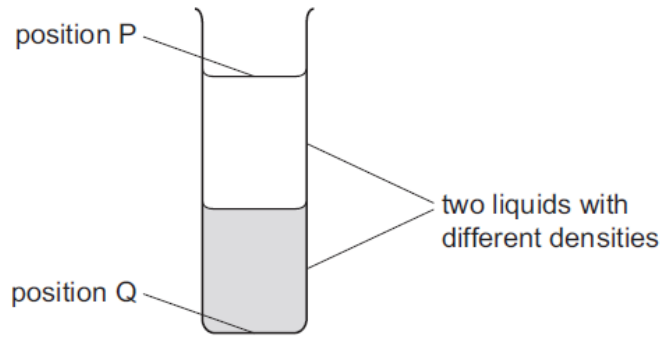
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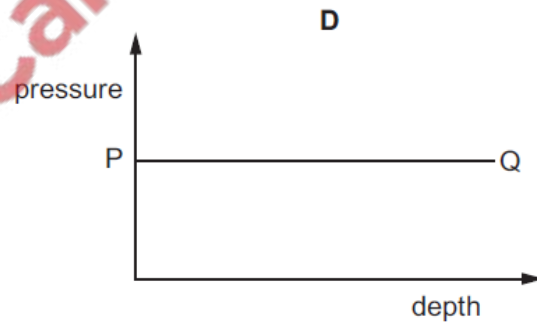
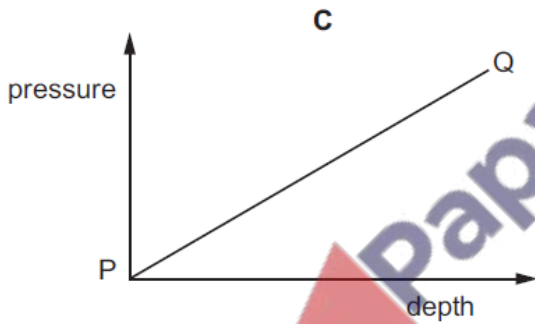
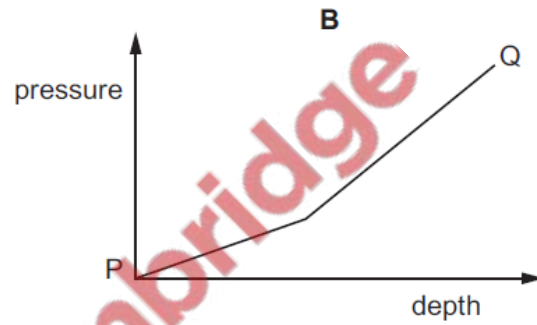
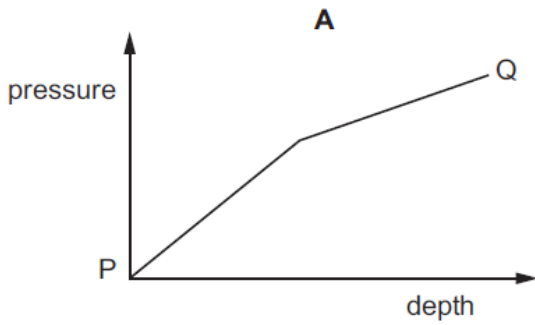


4. March/2020/Paper\_22/No.15

A tall cylinder is partly filled with two liquids which do not mix. The two liquids have different densities. A student measures the pressure due to the liquids at different depths.

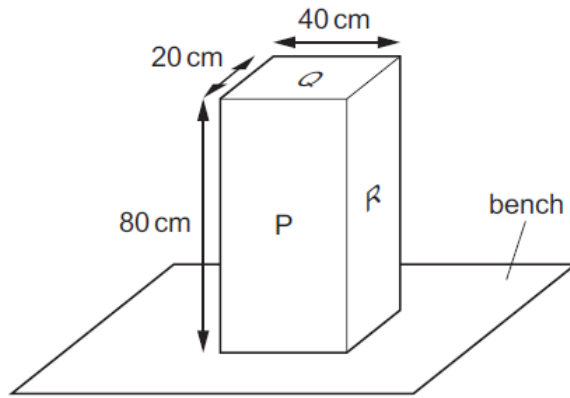


Which graph shows how the liquid pressure varies between positions P and Q?



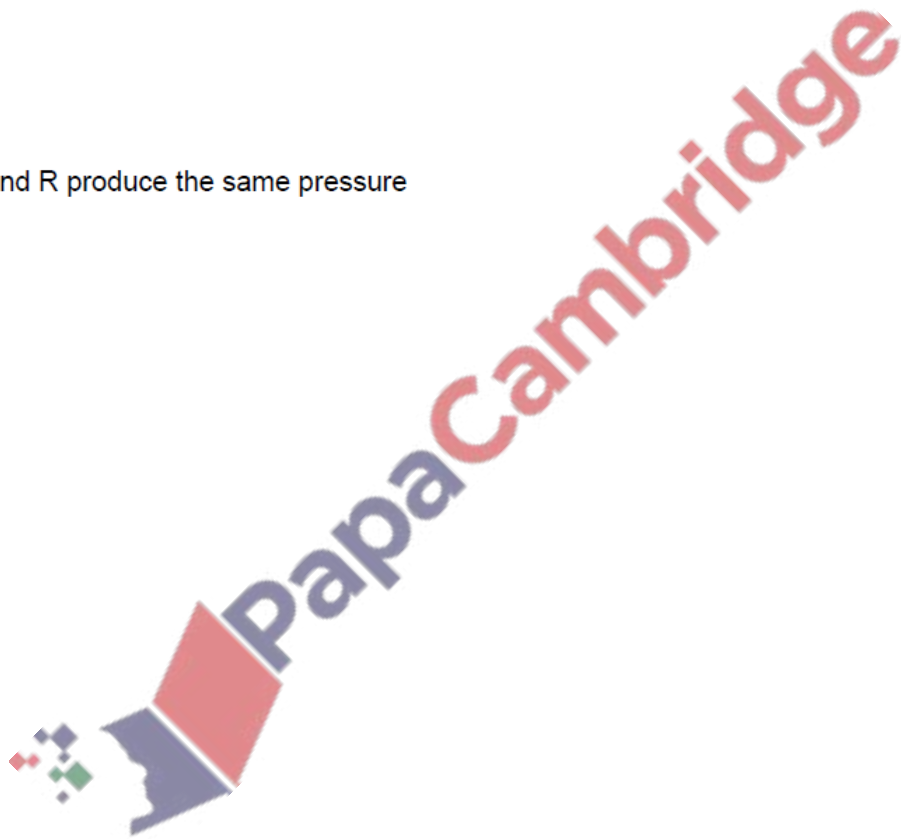
5. June/2020/Paper\_11/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.



On which labelled surface should the block rest to produce the smallest pressure on the bench?

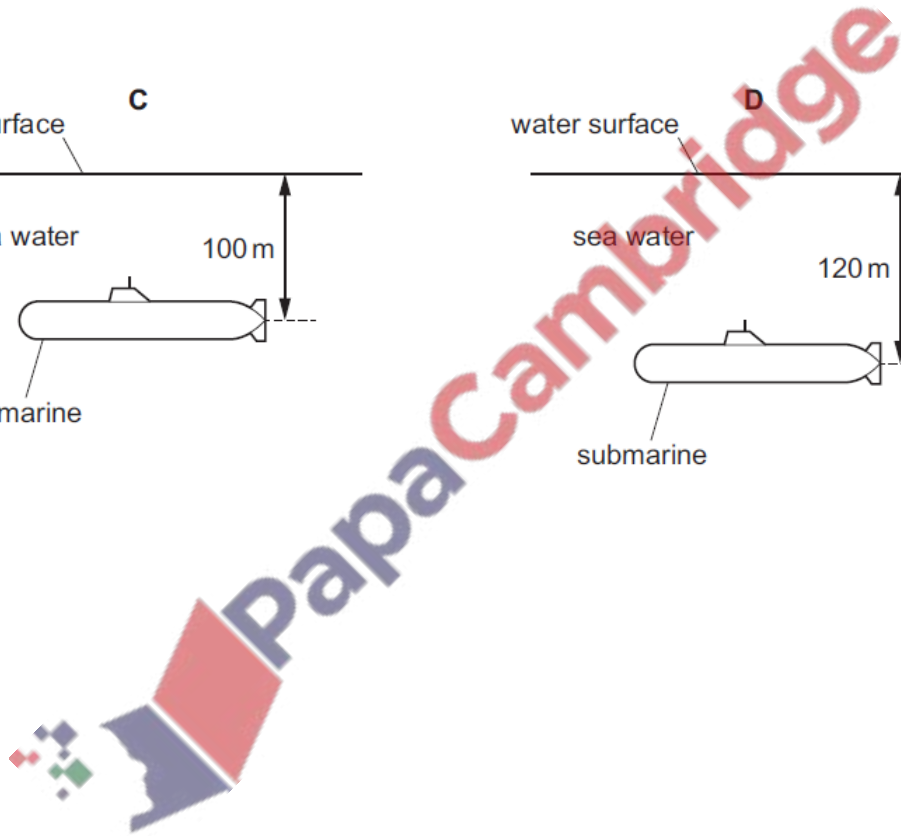
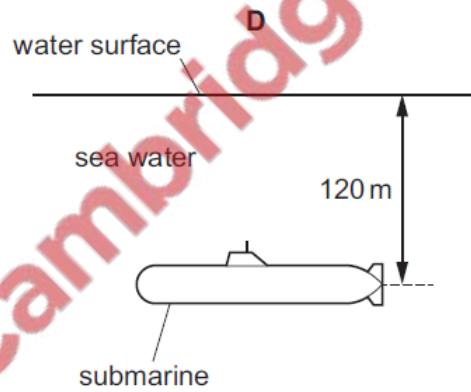
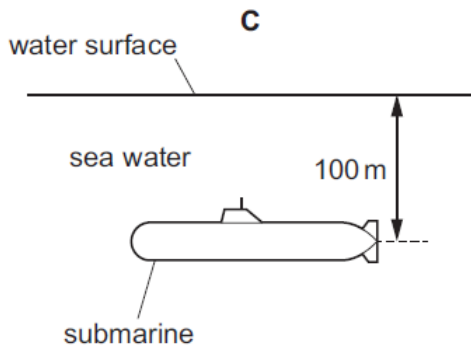
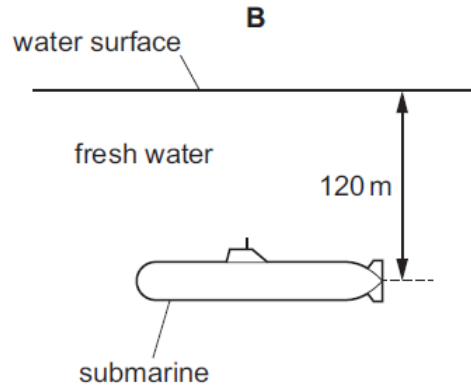
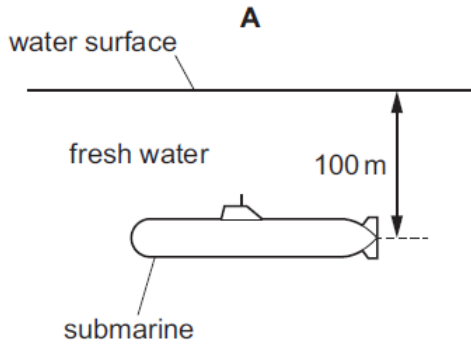
- A P
- B Q
- C R
- D P, Q and R produce the same pressure



6. June/2020/Paper\_11/No.13

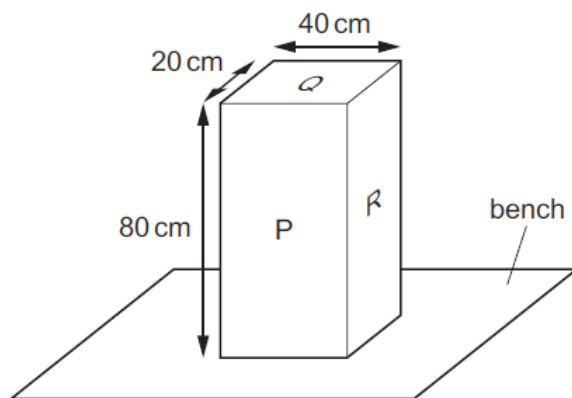
Four submarines are submerged. The density of fresh water is  $1000 \text{ kg/m}^3$  and the density of sea water is  $1020 \text{ kg/m}^3$ .

Which submarine experiences the greatest pressure due to the water?



7. June/2020/Paper\_12/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.

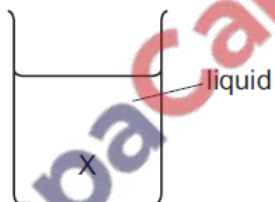


On which labelled surface should the block rest to produce the smallest pressure on the bench?

- A P
- B Q
- C R
- D P, Q and R produce the same pressure

8. June/2020/Paper\_12/No.13

A beaker contains a liquid.

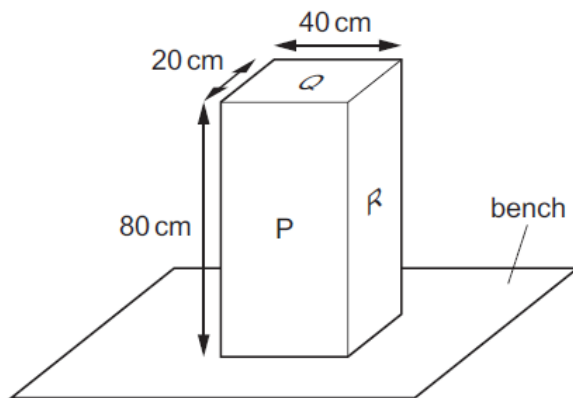


On what does the liquid pressure at position X depend?

- A both the density of the liquid and the depth of X below the surface
- B both the surface area of the liquid and the depth of X below the surface
- C both the surface area of the liquid and the volume of the liquid
- D the depth of X below the surface only

9. June/2020/Paper\_13/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.

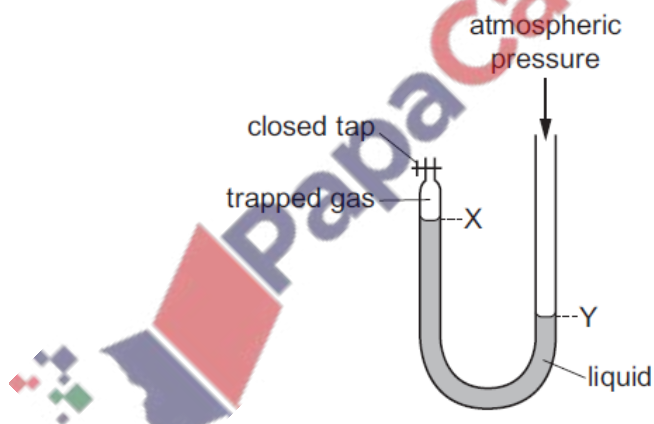


On which labelled surface should the block rest to produce the smallest pressure on the bench?

- A P
- B Q
- C R
- D P, Q and R produce the same pressure

10. June/2020/Paper\_13/No.13

The diagram shows a U-shaped glass tube, closed at one end by a tap. The glass tube contains a liquid as shown.



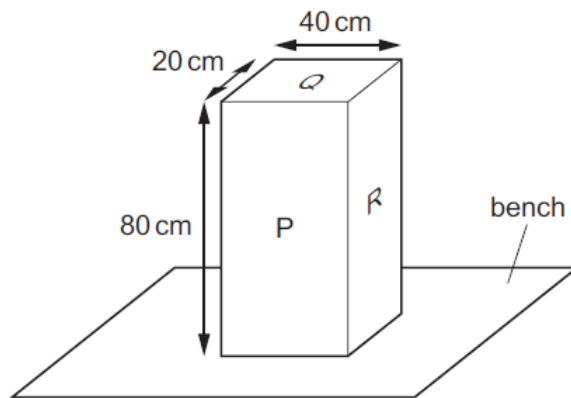
Some of the trapped gas is removed.

What will happen to the levels X and Y?

	level X	level Y
A	higher	lower
B	higher	higher
C	lower	higher
D	lower	lower

11. June/2020/Paper\_21/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.



On which labelled surface should the block rest to produce the smallest pressure on the bench?

- A P
- B Q
- C R
- D P, Q and R produce the same pressure

12. June/2020/Paper\_21/No.13

The pressure due to the liquid on an object immersed in that liquid is 4500 Pa.

The density of the liquid is  $900 \text{ kg/m}^3$ .

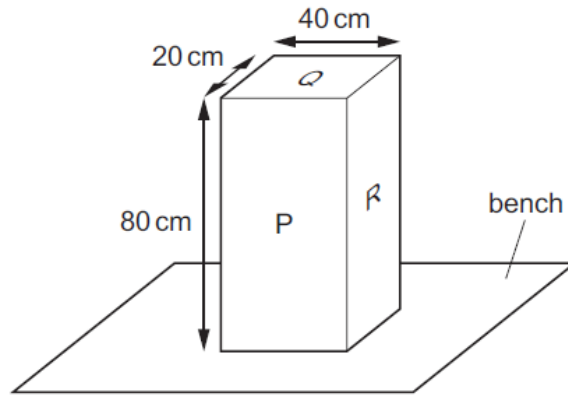
What is the depth of the object below the surface of the liquid?

- A 0.5 cm
- B 2.0 cm
- C 50 cm
- D 200 cm



13. June/2020/Paper\_22/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.



On which labelled surface should the block rest to produce the smallest pressure on the bench?

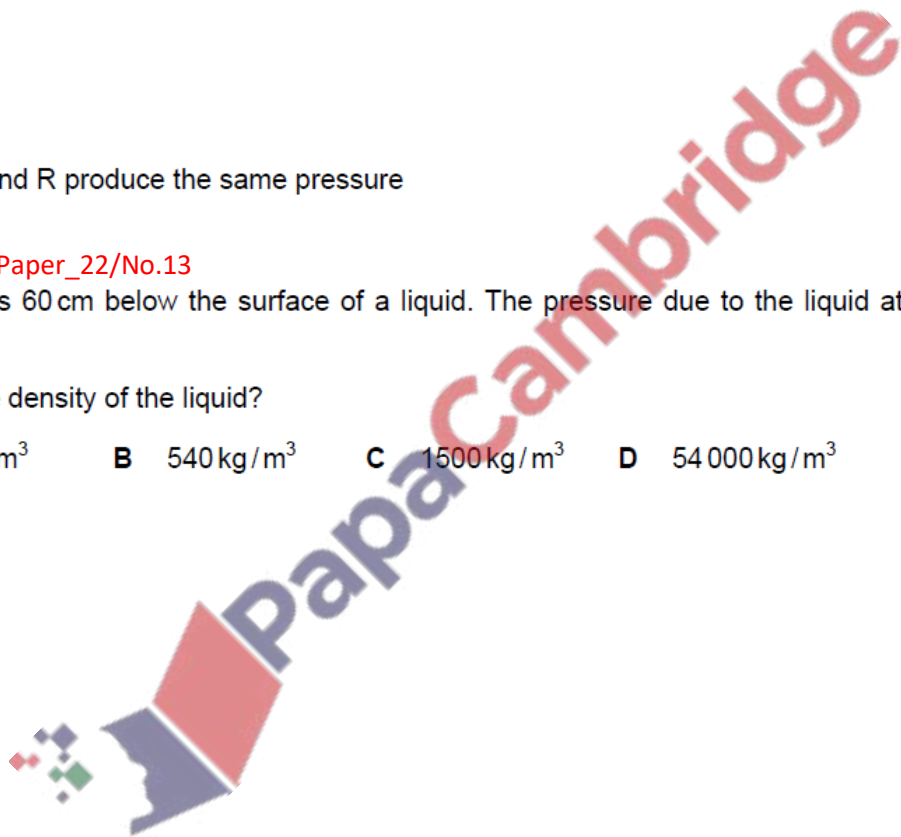
- A P
- B Q
- C R
- D P, Q and R produce the same pressure

14. June/2020/Paper\_22/No.13

An object is 60 cm below the surface of a liquid. The pressure due to the liquid at this depth is 9000 Pa.

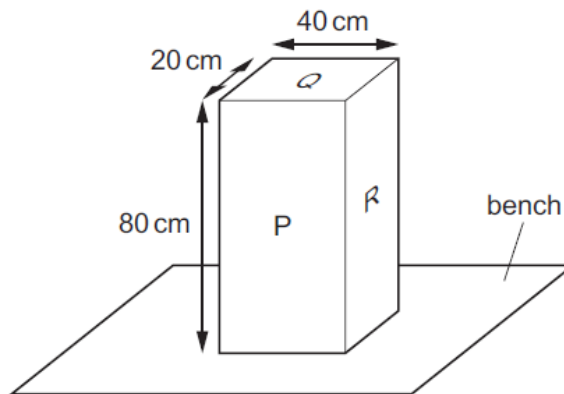
What is the density of the liquid?

- A  $15 \text{ kg/m}^3$       B  $540 \text{ kg/m}^3$       C  $1500 \text{ kg/m}^3$       D  $54000 \text{ kg/m}^3$



15. June/2020/Paper\_23/No.12

The diagram shows a solid block resting on a bench. The dimensions of the block are shown.



On which labelled surface should the block rest to produce the smallest pressure on the bench?

- A P
- B Q
- C R
- D P, Q and R produce the same pressure

16. June/2020/Paper\_23/No.13

A pipe full of water connects a water supply on a hill to a tap lower down the hill.

The length of the pipe is 500 m. The height of the supply above the tap is 100 m.

The density of the water is  $1000 \text{ kg/m}^3$ . The effect of atmospheric pressure is negligible.

What is the water pressure at the tap?

- A 100 000 Pa
- B 500 000 Pa
- C 1 000 000 Pa
- D 5 000 000 Pa

17. June/2020/Paper\_23/No.14

When a molecule rebounds from a wall, a force is exerted on the wall.

What causes this force?

- A the kinetic energy gained by the molecule
- B the kinetic energy lost by the molecule
- C the change of momentum of the molecule
- D the change of speed of the molecule

18. June/2020/Paper\_31/No.4(c)

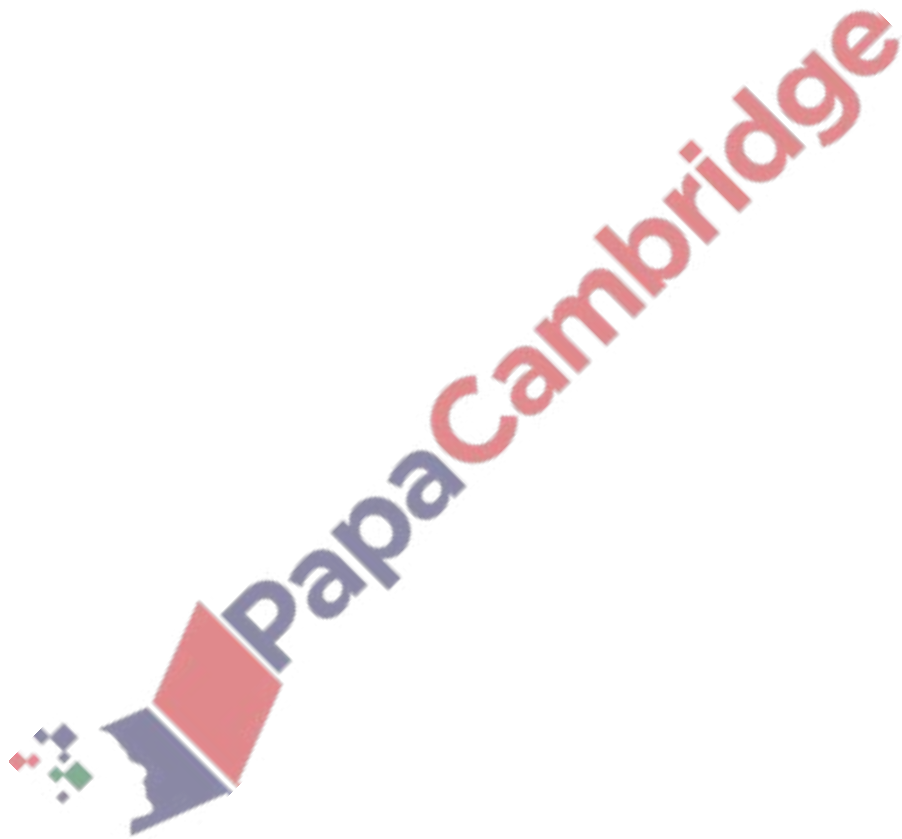
(c) Skis are strapped to a skier's feet and are longer and wider than the skier's feet.

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

.....

.....

..... [2]



19. June/2020/Paper\_32/No.3

Fig. 3.1 shows an archer pulling the string of a bow.

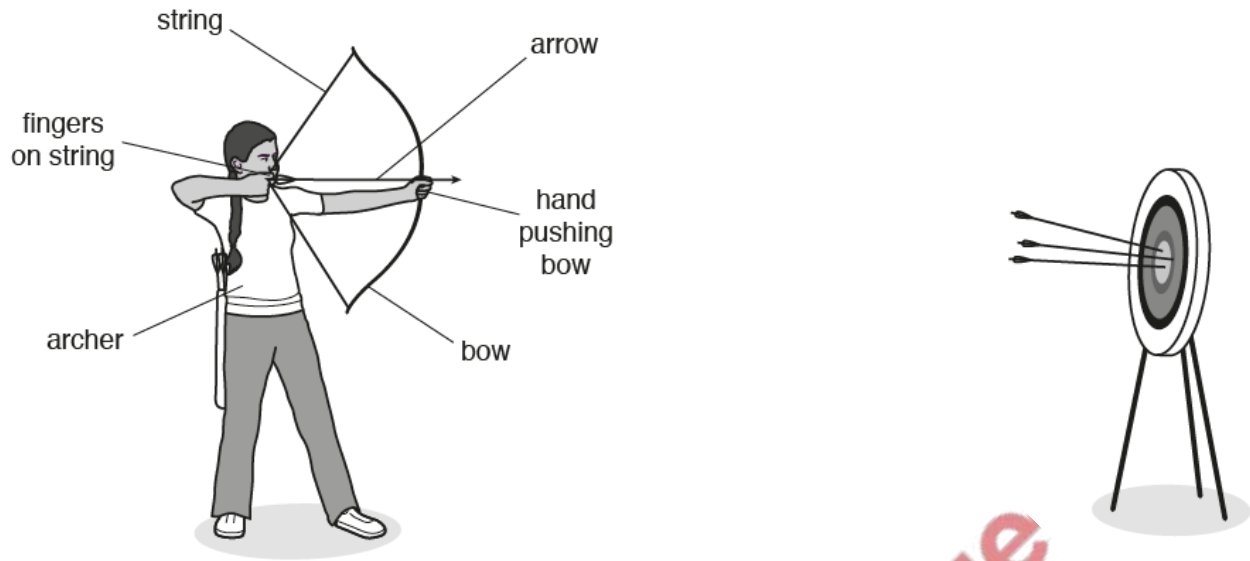


Fig. 3.1

- (a) The archer uses a force of 120 N. The force acts on an area of  $0.5 \text{ cm}^2$  on the archer's fingers. Calculate the pressure on the archer's fingers.

pressure on fingers = ..... N/cm<sup>2</sup> [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]

- (c) State the type of energy stored in the bow when the archer bends it as shown in Fig. 3.1.

..... [1]

[Total: 5]

Fig. 3.1 shows gas trapped in the sealed end of a tube by a dense liquid.

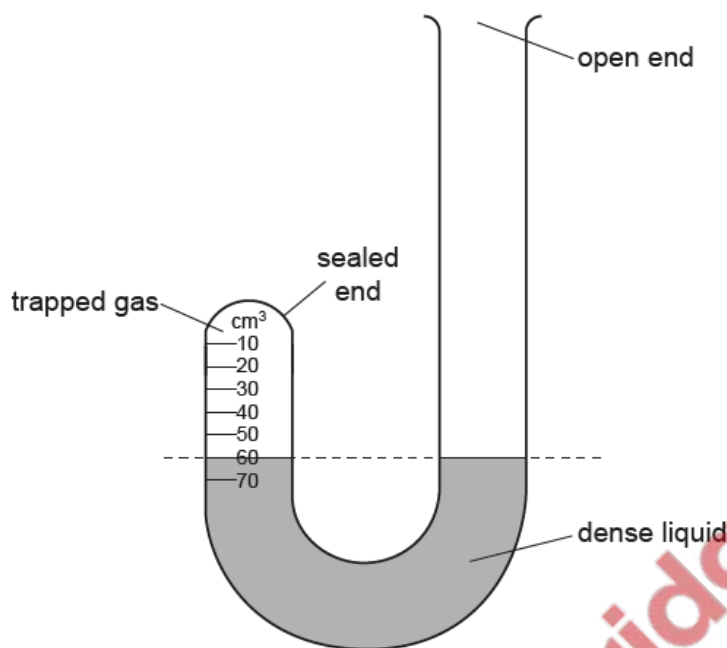


Fig. 3.1

The scale marked on the sealed end of the tube is calibrated to read the volume of gas trapped above the liquid surface. Fig. 3.1 shows that initially the volume  $V_1$  of the gas is  $60 \text{ cm}^3$ .

The pressure of the atmosphere is  $1.0 \times 10^5 \text{ Pa}$ .

- (a) State how Fig. 3.1 shows that the pressure of the trapped gas is equal to the pressure of the atmosphere.

.....  
 ..... [1]

- (b) Explain, in terms of the momentum of its molecules, why the trapped gas exerts a pressure on the walls of the tube.

.....  
 .....  
 .....  
 ..... [3]

- (c) More of the dense liquid is poured into the open end of the tube. The level of the liquid surface in both the sealed and the open ends of the tube rises as shown in Fig. 3.2. The temperature of the trapped gas and atmospheric pressure both remain constant.

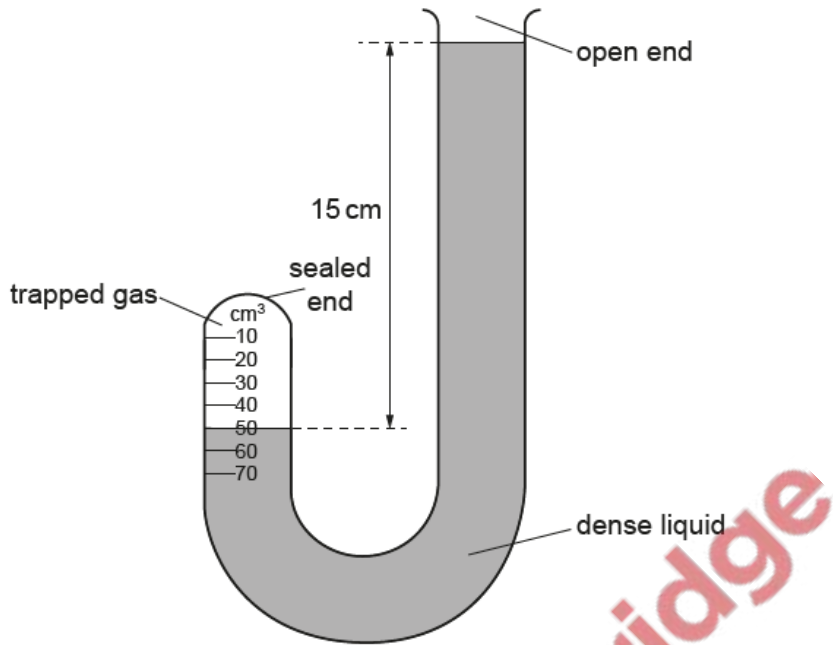


Fig. 3.2

- (i) In the sealed end of the tube, the volume  $V_2$  of the trapped gas is  $50\text{ cm}^3$ . In the open end of the tube, the liquid surface is  $15\text{ cm}$  above the new level in the sealed tube.

Calculate the pressure  $p_2$  of the trapped gas.

pressure  $p_2 = \dots\dots\dots$  [2]

- (ii) Calculate the density of the liquid in the tube.

density =  $\dots\dots\dots$  [2]

[Total: 8]

21. June/2020/Paper\_43/No.2

A scientist fills a container with sea water. The container has dimensions  $30\text{ cm} \times 30\text{ cm} \times 40\text{ cm}$ . The density of sea water is  $1020\text{ kg/m}^3$ .

(a) Calculate the mass of the sea water in the container.

mass = ..... [3]

(b) Fig. 2.1 shows a submarine. The submarine is fully submerged in the sea.

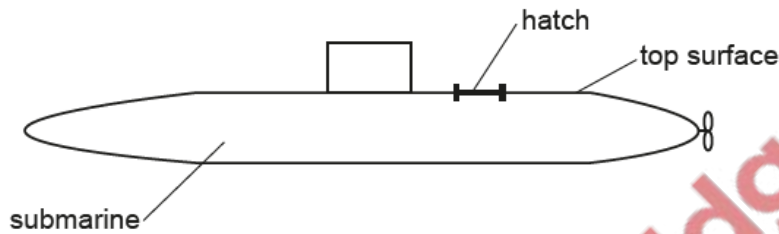


Fig. 2.1

(i) The atmospheric pressure is  $100\text{ kPa}$  and the total pressure on the top surface of the submarine is  $500\text{ kPa}$ .

Calculate the depth of the top surface of the submarine below the surface of the sea.

depth = ..... [3]

(ii) A hatch (an opening door) on the top surface of the submarine has an area of  $0.62\text{ m}^2$ .

Calculate the downward force on the hatch due to the total pressure on the top surface of the submarine.

force = ..... [2]

[Total: 8]