Pressure – 2023 IGCSE Physics 0625

1. Nov/2023/Paper_ 0625/11/No.11

When a diver swims down from the surface of the water to a depth of 10 m, the pressure experienced increases from 100 000 N / m^2 to 200 000 N / m^2.

Which statement explains this increase in pressure?

A The density of the water increases with depth.

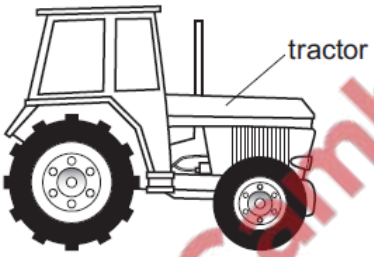
B The gravitational field strength increases with depth.

C The weight of water above the diver increases with depth.

D Water cannot be compressed.

2. Nov/2023/Paper_ 0625/12/No.11

Tractors have large tyres. These help to prevent the wheels from sinking into soft ground.



Which statement explains this?

A Larger tyres exert a greater force on the ground.

B Larger tyres exert a greater pressure on the ground.

C Larger tyres exert a smaller force on the ground.

D Larger tyres exert a smaller pressure on the ground.

3. Nov/2023/Paper_ 0625/13/No.11

Why is it easier to push a sharp nail, rather than a blunt nail, into a piece of wood?

A The sharp nail exerts a larger force on the wood.

B The sharp nail exerts a smaller force on the wood.

C The sharp nail exerts a larger pressure on the wood.

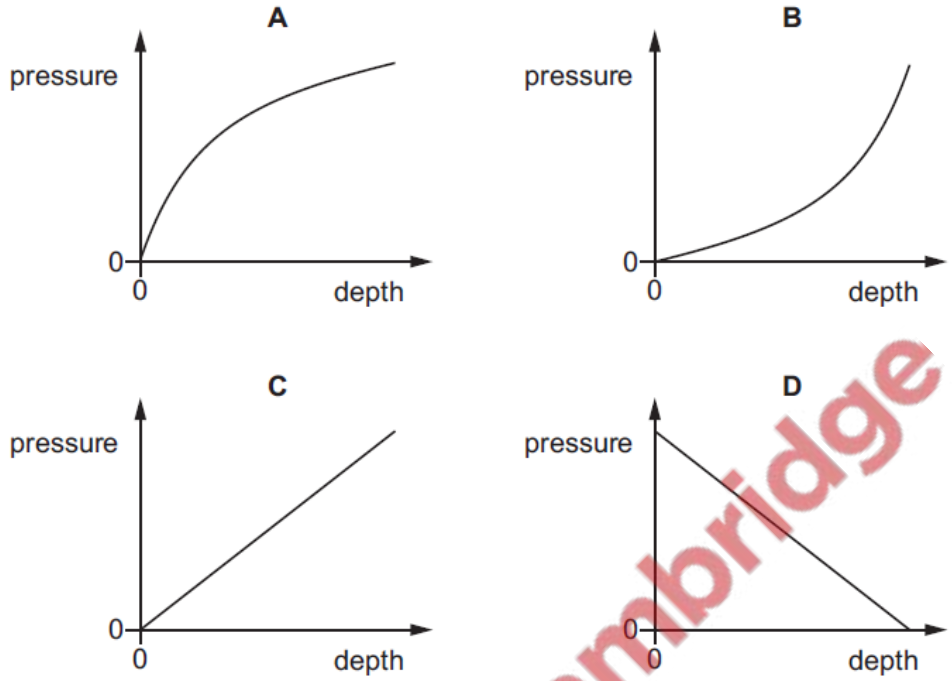
D The sharp nail exerts a smaller pressure on the wood.

4. Nov/2023/Paper_ 0625/21/No.11

The water in a swimming pool exerts a pressure at the bottom of the pool.

Which graph shows the relationship between the pressure exerted by the water and the depth of water in the pool?

(Assume the density of water is constant.)



5. Nov/2023/Paper_ 0625/22/No.11

An object is a depth h below the surface of a liquid. The pressure due to the liquid at this depth is p. The gravitational field strength is g.

What is the density ρ of the liquid?

A $\rho = pgh$ **B** $\rho = \frac{pg}{h}$ **C** $\rho = \frac{ph}{g}$ **D** $\rho = \frac{p}{hg}$

6. Nov/2023/Paper_ 0625/22/No.11

An object is immersed in a liquid of density ρ. The pressure at this depth due to the liquid is p. The gravitational field strength is g.

What is the equation for the depth h of the object beneath the surface?

A $h = p\rho g$ **B** $h = \frac{\rho g}{p}$ **C** $h = \frac{p}{\rho g}$ **D** $h = \frac{pg}{\rho}$

7. Nov/2023/Paper_ 0625/41/No.3(b)

(b) Fig. 3.1 shows a rectangular block floating in water. The density of the water is 1000 kg/m^3.

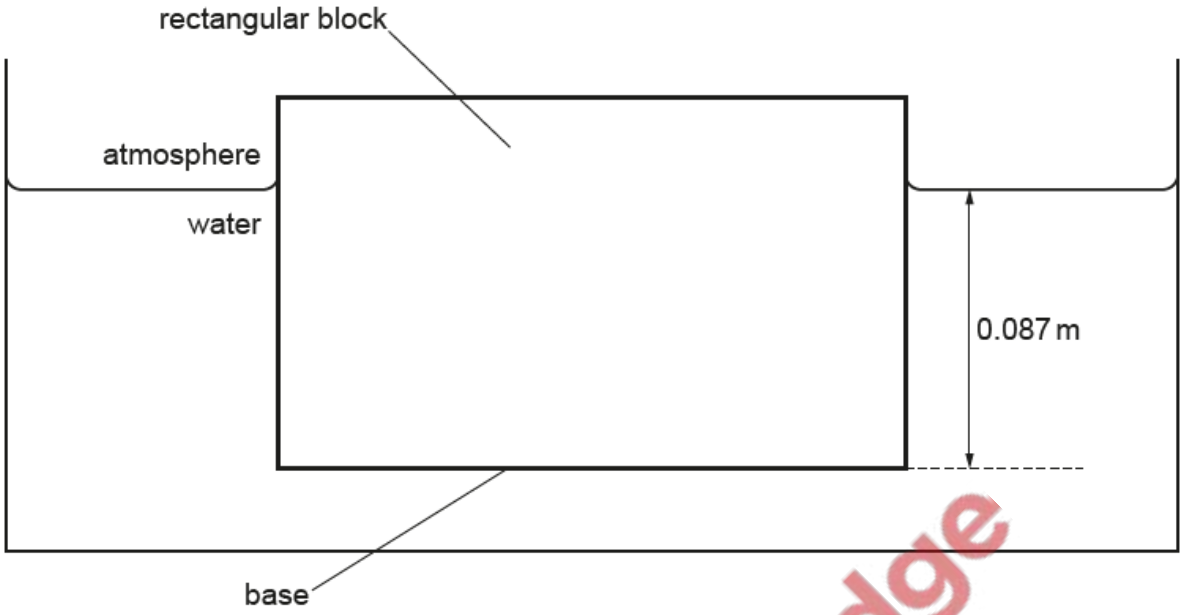


Fig. 3.1

The area of the base of the block is 0.014 m^2. The base of the block is at a depth of 0.087 m below the surface of the water.

(i) Show that the pressure due to the water at the base of the block is approximately 850 Pa.

[2]

(ii) Calculate the force F on the base of the block caused by the pressure given in **(b)(i)**.

F = ... [2]

(iii) Force F is equal to the weight of the block.

Calculate the mass of the block.

mass = ... [2]

8. Nov/2023/Paper_ 0625/42/No.4(c)

Fig. 4.1 shows a bottle part-filled with water. The air inside the bottle is at the same pressure as the air outside the bottle. The bottle and its contents are at room temperature.

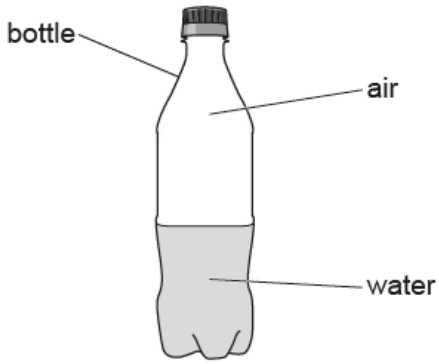


Fig. 4.1

(c) Another plastic bottle is filled to the top with water. The height of the bottle is 40.0 cm. The density of water is 1.0×10^3 kg/m^3.

Calculate the pressure difference between the top and bottom of the water.

pressure difference = ... [2]

9. June/2023/Paper_0625/11/No.13

A woman has a weight of 600 N. She stands on a horizontal floor. The area of her feet in contact with the floor is 0.050 m^2.

What is the pressure she exerts on the floor?

A 1.2×10^3 N/m^2

B 2.4×10^3 N/m^2

C 1.2×10^4 N/m^2

D 2.4×10^4 N/m^2

10. June/2023/Paper_0625/12/No.13

A rectangular marble block has dimensions 1 m by 1 m by 5 m and weighs 125 000 N.

The marble block is stored with the long side resting on the ground, as in diagram 1.

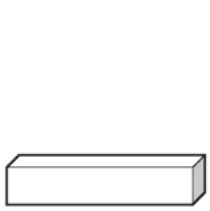


diagram 1

diagram 2

What is the change in the pressure on the ground due to the block when the block is stored as in diagram 2 rather than diagram 1?

A a decrease of 25 000 N/m^2

B an increase of 100 000 N/m^2

C an increase of 125 000 N/m^2

D no change

11. June/2023/Paper_0625/13/No.13

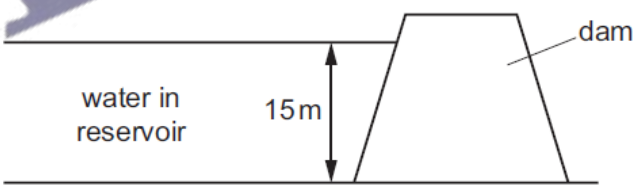
A solid cube has sides 0.50 m long and a mass of 120 kg. It stands on the ground on one face.

Which pressure does the cube exert on the ground?

A 480 kg/m^3 **B** 960 kg/m^3 **C** 4700 N/m^2 **D** 9400 N/m^2

12. June/2023/Paper_0625/21/No.13

A dam holds water in a reservoir. The height of the water in the reservoir is 15 m.



The density of water is 1000 kg/m^3.

What is the pressure due to the water at the bottom of the dam?

A 6.8 Pa **B** 1500 Pa **C** 15 000 Pa **D** 150 000 Pa

13. June/2023/Paper_0625/22/No.13

The density of sea water is 1030 kg / m^3.

The gravitational field strength on the Earth is 9.8 N / kg.

Atmospheric pressure is 101 000 Pa.

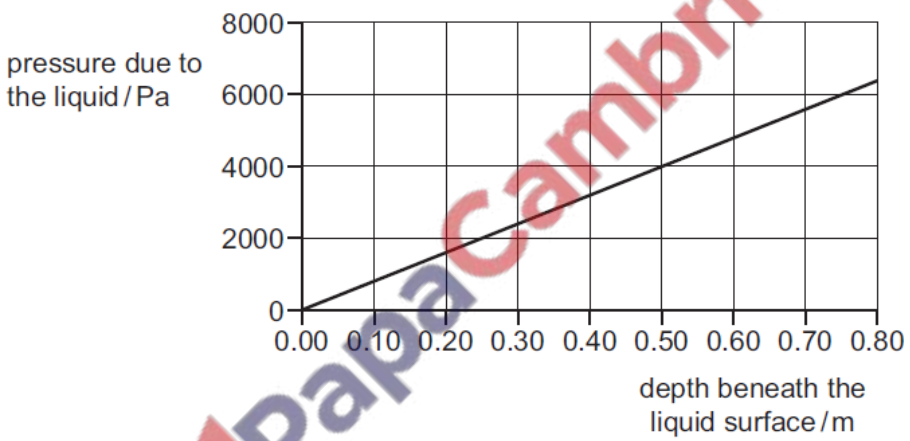
At which depth in sea water is the total pressure due to the atmosphere and the water equal to 513 000 Pa?

A 40.8 m **B** 50.8 m **C** 400 m **D** 498 m

14. June/2023/Paper_0625/23/No.13

The graph shows how the pressure due to a liquid varies with the depth beneath the liquid surface.

The gravitational field strength *g* is 9.8 N / kg.



What is the density of the liquid?

A 200 kg / m^3 **B** 820 kg / m^3 **C** 2000 kg / m^3 **D** 8200 kg / m^3

15. June/2023/Paper_0625/31/No.2(a)

Fig. 2.1 shows a concrete beam resting on the ground.

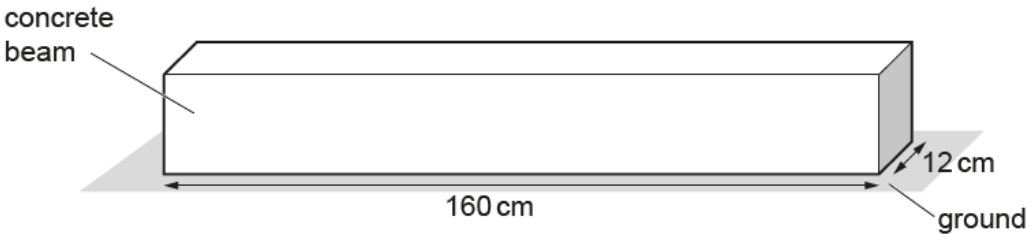


Fig. 2.1 (not to scale)

(a) The weight of the concrete beam is 1540 N.

Calculate the pressure on the ground due to the concrete beam.

pressure = ... N/cm^2 [4]

16. June/2023/Paper_0625/32/No.3(c)

A student has a battery-powered torch. Fig. 3.1 shows the torch.

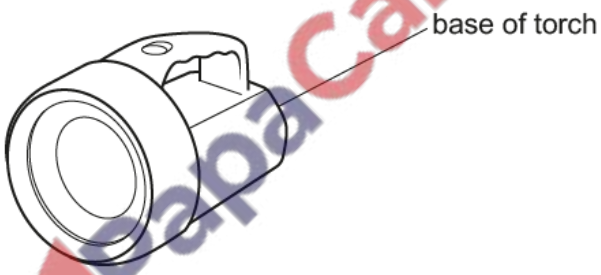


Fig. 3.1

(c) The student places the torch on its base on a shelf. The area of the base of the torch is 44 cm^2. The weight of the torch is 8.5 N.

Calculate the pressure on the shelf due to the torch.

pressure on shelf = ... N/cm^2 [3]

17. June/2023/Paper_0625/33/No.4(c)

A tight-fitting lid keeps air inside a metal can.
An airtight rubber bung holds a liquid-in-glass thermometer that is inserted through a hole in the lid, as shown in Fig. 4.1.

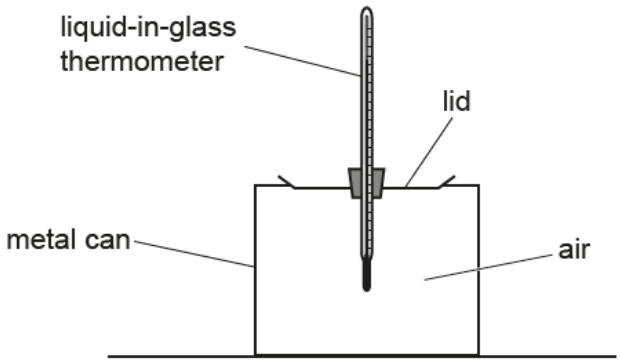


Fig. 4.1

(c) The air in another can exerts a pressure of 102 000 N / m^2 on the lid. The area of the can lid is 0.0082 m^2.

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

force = ... N [3]

18. June/2023/Paper_0625/42/No.3

(a) Fig. 3.1 shows a person moving across an ice-covered pond to reach a ball on the ice.

Fig. 3.1

Explain why this way of moving across the ice is safer than walking. Use your understanding of pressure in your answer.

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..... [3]

(b) Fig. 3.2 shows a side view of the pond with a layer of ice floating freely on the water.

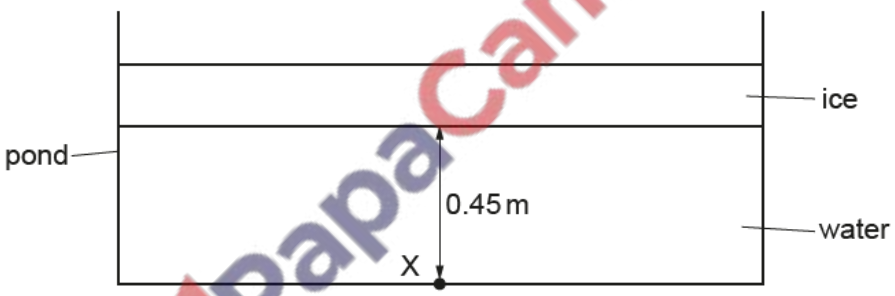

Fig. 3.2

The surface area of the pond is 5.0 m^2.
The mass of the ice is 690 kg.
The density of water is 1000 kg/m^3.
Point X is 0.45 m below the ice.

Calculate the pressure at point X due to the ice and the water.

pressure = ... [4]

[Total: 7]

19. June/2023/Paper_0625/43/No.2(a)

(a) **(i)** Define pressure.

.....

..... [1]

(ii) Describe how pressure in a liquid varies with its depth and with its density.

variation with depth

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.....

variation with density

.....

..... [2]