Pressure and pressure difference in fluids – GCSE Physics Paper 2

1. No.6

0 6 The Earth is surrounded by an atmosphere.

0 6 . 1 The radius of the Earth is 6400 km.

Which of the following could be an approximate depth of the Earth's atmosphere?

[1 mark]

Tick (✓) **one** box.

100 km ☐

6400 km ☐

100 000 km ☐

640 000 km ☐

0 6 . 2 What state of matter is most of the Earth's atmosphere?

[1 mark]

Tick (✓) **one** box.

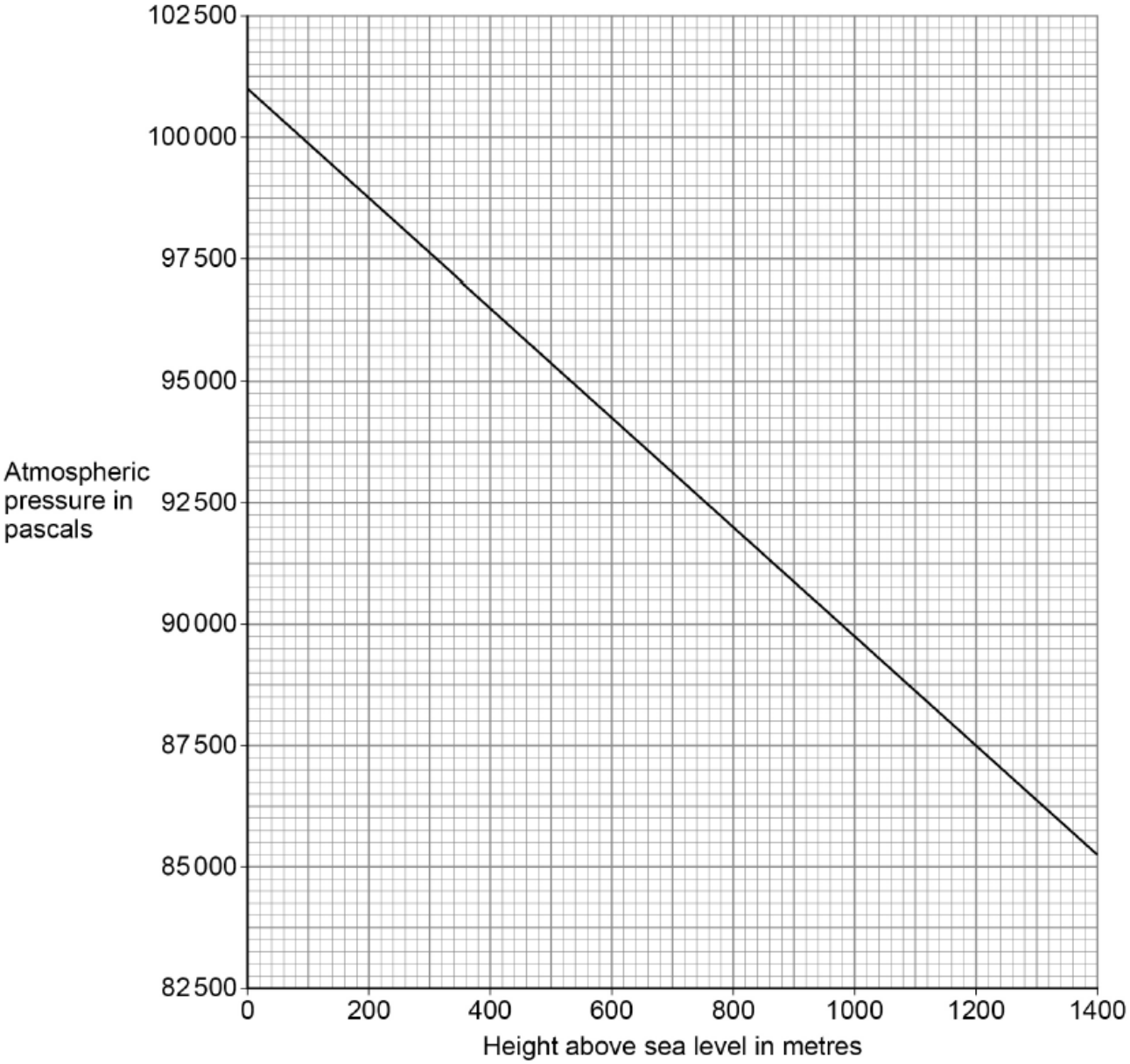
Gas ☐

Liquid ☐

Solid ☐

Figure 12 shows how atmospheric pressure varies with height above sea level.

Figure 12



0 6 . 3 The highest point above sea level in England is the top of a mountain called Scafell Pike.

The height above sea level of Scafell Pike is 978 m.

Determine the atmospheric pressure at the top of Scafell Pike.

Use **Figure 12**.

[1 mark]

Atmospheric pressure = _____ Pa

0 6 . 4 Determine the difference between the atmospheric pressure at sea level and at the top of Scafell Pike.

Use **Figure 12** and your answer from Question **06.3**

[1 mark]

Difference in atmospheric pressure = _____ Pa

0 6 . 5 A student climbs Scafell Pike.

Why does the atmospheric pressure decrease as the student climbs higher?

[2 marks]

Tick (✓) **two** boxes.

- The air exerts a greater force on the student. ☐
- The density of the air decreases. ☐
- The mass of air above the student decreases. ☐
- The temperature of the air increases. ☐
- The volume of air above the student increases. ☐

0 6 . 6 **Figure 13** shows a mountain lake.

Figure 13

The lake has a surface area of 2000 m^2.

Atmospheric pressure exerts a force of 188 000 000 N on the surface of the lake.

Calculate the atmospheric pressure at the surface of the lake.

Use the equation:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

[2 marks]

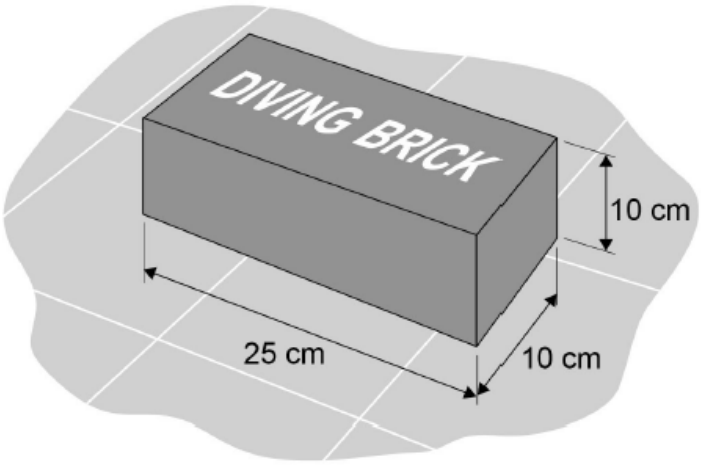
Atmospheric pressure = _____ Pa

2. No.8

0 8 Diving bricks sink to the bottom of a swimming pool.

Figure 14 shows a diving brick.

Figure 14



Swimmers practise diving to the bottom of the swimming pool to pick up the diving brick.

0 8 . 1 Explain why the forces on the brick at the bottom of the pool cause the brick to be stationary.

[3 marks]

0 8 . 2 When the brick from **Figure 14** is at the bottom of the pool, the top surface of the brick is 2.50 m below the surface of the water.

The force acting on the top surface of the brick due to the weight of the water is 637 N.

gravitational field strength = 9.8 N/kg

Calculate the density of the water in the swimming pool.

Use the Physics Equations Sheet.

[6 marks]

Density of water = _____ kg/m^3

0 8 . 3 Professional divers are trained in a very deep swimming pool.

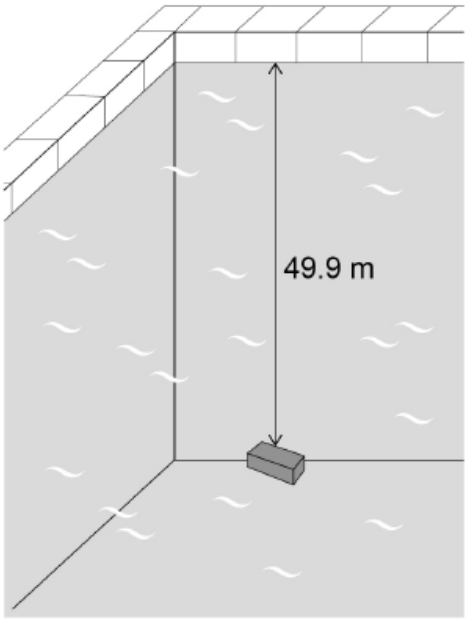
The density of the water in this pool is **not** the same as the density of the water in Question **08.2**

The diving brick was dropped into the very deep swimming pool.

When the brick was at a depth of 2.50 m, the force due to the weight of the water on the top surface of the brick was 618 N.

Figure 15 shows the diving brick at the bottom of the very deep swimming pool.

Figure 15



Determine the force due to the weight of the water on the top surface of the brick in **Figure 15**.

Use the Physics Equations Sheet.

Give your answer to 3 significant figures.

[3 marks]

Force (3 significant figures) = _____ N