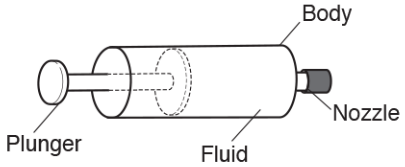
# Pressure (H)

**1.** A fluid is compressed by pushing the plunger into the body of a sealed syringe.




Which of these statements is true?

**A** There is a net force towards the plunger.
**B** There is no force towards the nozzle.
**C** There is a force parallel to all points on the surface of the fluid.
**D** There is a force at 90° to all points on the surface of the fluid.

Your answer **[1]**

**2.** Which factor influences whether an object floats or sinks?

**A** Size of object
**B** Depth of water
**C** Distance from the shore
**D** Density of object

Your answer **[1]**

**3.** Which statement explains why atmospheric pressure changes as you climb up a mountain?

**A** Number of air molecules above you decrease the further you move from the centre of the Earth.
**B** Density of air increases the further you move from the centre of the Earth.
**C** Gravity increases the further you move from the centre of the Earth.
**D** Temperature decreases the further you move from the centre of the Earth.

Your answer **[1]**

**4.** What is the change in pressure when a diver moves from a depth of 3.0 m to a depth of 8.0 m?

Assume gravitational field strength on Earth = 10 N / kg and water density = 1000 kg / m$^3$.

Use an equation from the data sheet to help you.

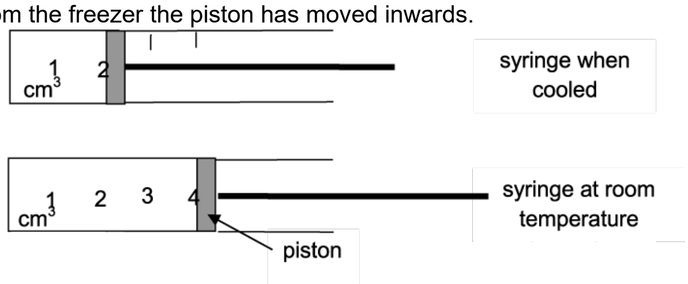
**A** 30 000 Pa
**B** 50 000 Pa
**C** 80 000 Pa
**D** 110 000 Pa

Your answer **[1]**

**5.** A graduated syringe contains air.

It is put in a freezer to cool it down.

When it is removed from the freezer the piston has moved inwards.




The density of the air in the syringe when cooled is 2.4 kg/m$^3$.

What was the density of the air at room temperature?

**A.** 0.6 kg/m$^3$
**B.** 1.2 kg/m$^3$
**C.** 2.4 kg/m$^3$
**D.** 4.8 kg/m$^3$

Your answer **[1]**

**6 (a).** A depth of 10 m of water exerts the same amount of pressure as the entire Earth's atmosphere which is ~ 120 km thick.

Suggest why.

**[1]**

**(b).** A diver takes some pressure readings.

Their results are in the table below.

| **Depth of water (m)** | **Pressure (standard units)** |
|---|---|
| 0 | 1 |
| 10 | 2 |
| 20 | 3 |
| 30 | 4 |
| 40 | 5 |
| 50 | 6 |

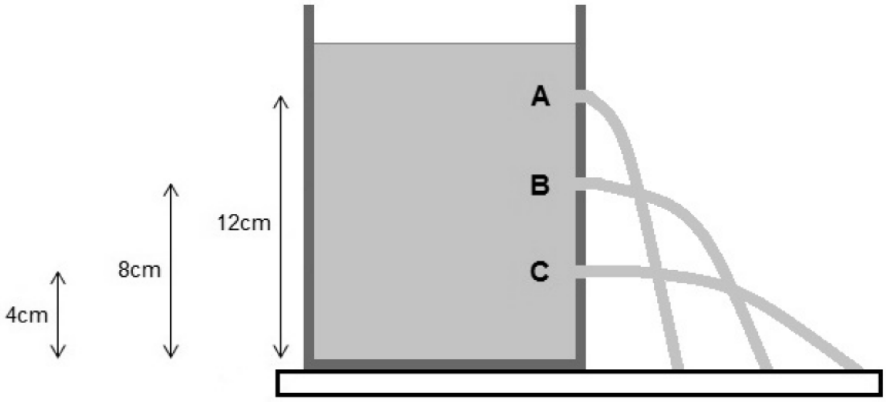
Use the data to describe the relationship between the depth of water and pressure.

**[2]**

**(c).** Suggest why there is pressure at 0 metres.

**[1]**

**(d).** A container of vegetable oil has 3 holes in it.




The vegetable oil has a density of $9.1 \times 10^2$ kg/m$^3$.

Calculate the change in pressure from **A** to **B**.

Show your working and give your answer to **2** significant figures.

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**answer:** ........................................ Pa

**[4]**

**7.** *The Earth contains a crust, mantle and core as shown in **Fig. 22.1**.

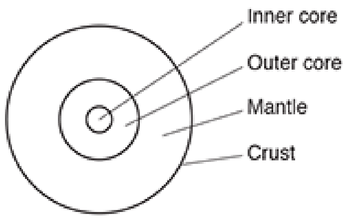


**Fig. 22.1**

**Table 22.1** gives some data about seismic waves and the Earth.

| | Density (g / cm$^3$) | P wave speed (km / s) | S wave speed (km / s) |
|---|---|---|---|
| **Top of crust** | 2.2 | 5.55 | 3.25 |
| **Top of mantle** | 3.4 | 7.97 | 4.55 |
| **Top of outer core** | 9.9 | 8.10 | - |
| **Bottom of outer core** | 12.2 | 10.30 | - |

**Table 22.1**

Describe what information the data in **Table 22.1** gives about the structure of the Earth.

In your answer you should explain any trends in the data in **Table 22.1**.

**[6]**

**8(a).** A student investigates four gases.

Look at her data.

| Gas | Pressure (Pa) | Volume (m$^3$) |
|---|---|---|
| **A** | 5 | 0.5 |
| **B** | 10 | 0.4 |
| **C** | 20 | 0.2 |
| **D** | 40 | 0.2 |

Two readings are for the same mass of the same gas at a constant temperature.

Which two readings are for the **same mass** of the **same gas** at a constant temperature?

Use calculations in your answer.

**[3]**

**(b).** The student investigates another gas at **constant volume.**

Explain, using ideas about particles, how temperature affects gas pressure.

**[3]**

**(c).** Calculate the pressure at the bottom of a 0.5 m tall measuring cylinder filled with a liquid.

Density of the liquid = 1100 kg / $m^3$.

Pressure = ..................................................... Pa **[3]**

**9.** A boat can be made out of concrete.
Explain why a concrete boat floats but a lump of concrete sinks.

**[3]**

**END OF QUESTION PAPER**