Pressure

Question Paper

Level	Edexcel
Subject	Physics
Exam Board	GCSE(9-1)
Topic	Forces & Matter
Sub Topic	Pressure
Booklet	Question Paper

Time Allowed: **27 minutes**

Score: **/22**

Percentage: **/100**
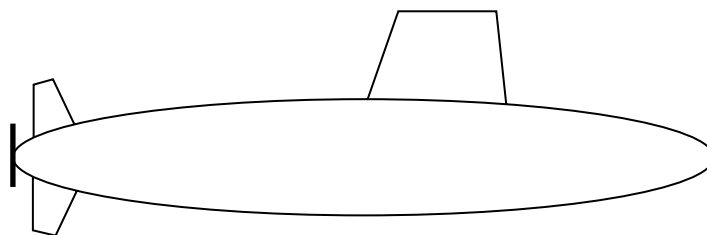
1 Figure 24 shows a submarine underwater.

air
_____

water

Figure 24

The motor in the submarine turns the gear wheels shown in Figure 25.

gear wheel A
has 30 teeth

A turns
clockwise

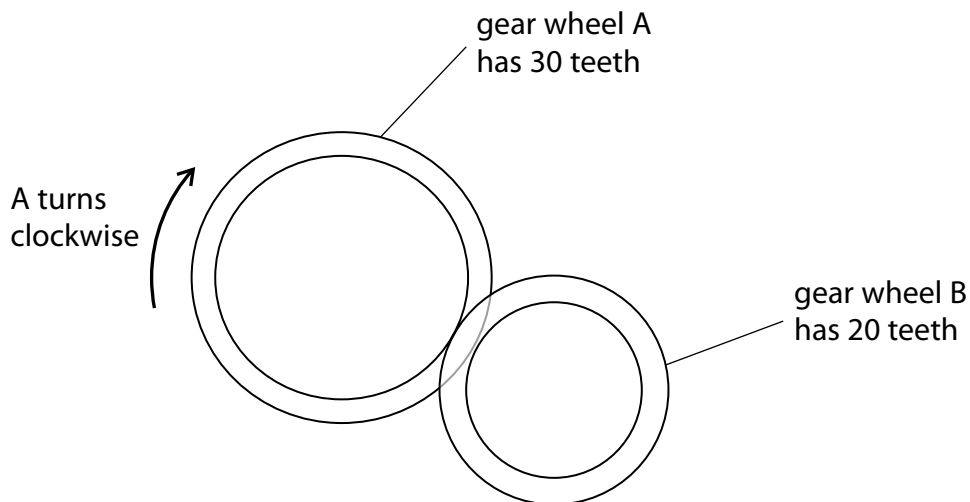gear wheel B
has 20 teeth

Figure 25

(a) Gear wheel A rotates clockwise through one complete turn.

Which of these is correct for gear wheel B?

(1)

	amount that gear wheel B rotates	direction gear wheel B rotates
☒ **A**	1½ turns	clockwise
☒ **B**	1½ turns	anticlockwise
☒ **C**	⅔ of a turn	clockwise
☒ **D**	⅔ of a turn	anticlockwise

(b) A bubble of gas escapes from the submarine.

The volume of the bubble is $23.0\,cm^3$.

The pressure of the gas inside the bubble is $297\,kPa$.

The bubble rises to the surface without changing temperature.

Calculate the volume of the bubble when it reaches the surface.

Atmospheric pressure = $101\,kPa$

Use an equation from the formula sheet.

(3)

volume = ... cm^3

(c) A student is interested in the way that submarines are controlled.

She has several regular wooden blocks, a set of weights and a tank of water.
Wood floats in water.

The student plans to immerse the wooden blocks fully in the water and investigate
the relationship between the upthrust and the weight of water displaced.

Describe how she should determine **one** of the variables in this investigation.

(2)

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*(d) Figure 26 shows the submarine stationary and submerged at a depth of 10 m.

air

water

buoyancy tank   water in buoyancy tank
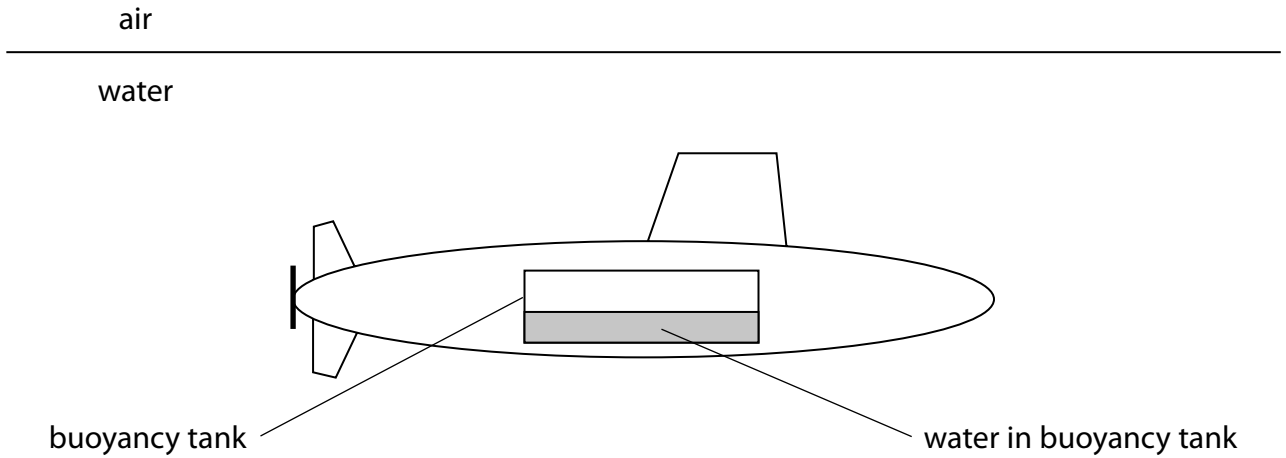
Figure 26

Explain how pumping water into and out of the buoyancy tank affects the depth
of the submarine below the surface.

(6)

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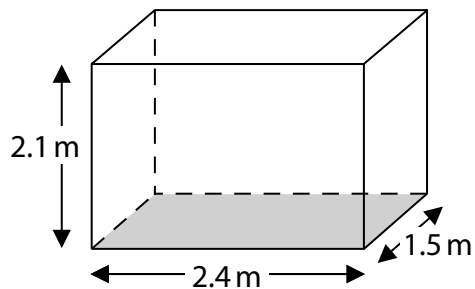
(Total for Question 9 = 12 marks)

2 (a) Figure 13 shows a tank for holding water.

Figure 13

The tank has sides of 2.4 m, 2.1 m and 1.5 m.

The pressure at the bottom of the tank is 12 kPa.

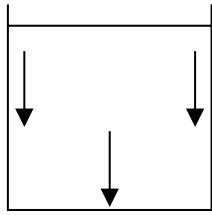(i) State the equation relating pressure, force and area.

(1)

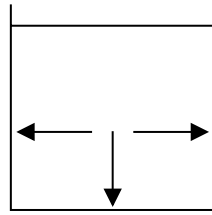(ii) Calculate the weight of water in the tank.

(4)

weight = ... N

(iii) Which diagram shows the direction of the forces from the water on the inside of the tank?

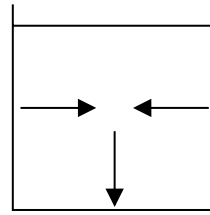(1)
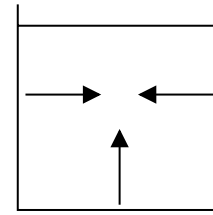
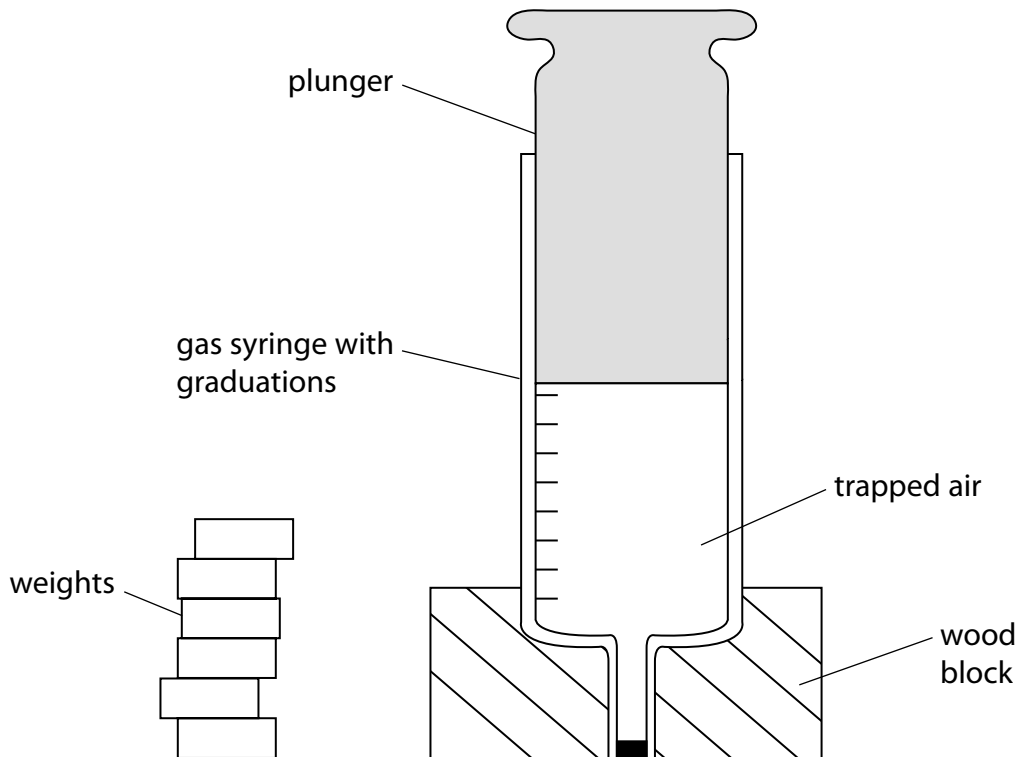☒ **A**   ☒ **B**   ☒ **C**   ☒ **D**

(b) A student makes the following hypothesis:

'When I increase the pressure on a fixed mass of gas, the volume of the gas decreases'.

She has the equipment shown in Figure 14.

Figure 14

She measures the area of the plunger.

Devise a plan to test her hypothesis.

(4)

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(Total for Question 6 = 10 marks)