Questions

Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 3 shows a diver swimming in a lake.

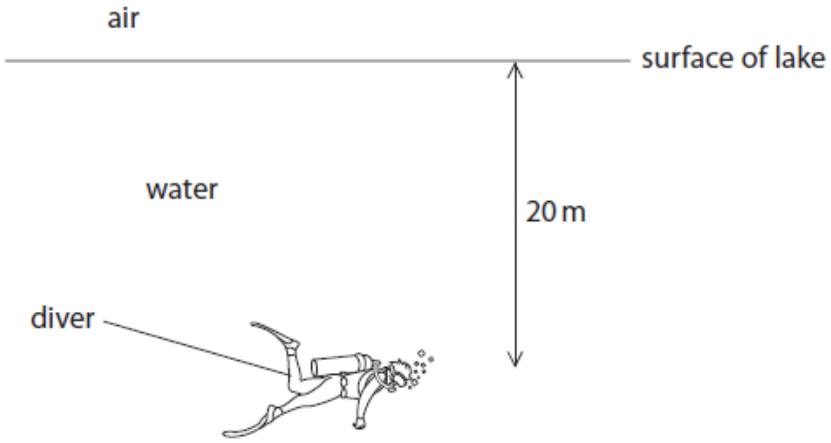

Figure 3

The pressure on the diver is due to both the water above him and the Earth's atmosphere.

The pressure of air on the surface of the water is one atmosphere. 10 m of water is equivalent to one atmosphere.

How many atmospheres of pressure will be on the diver at a depth 20 m?

(1)

☒ **A** 1

☒ **B** 2

☒ **C** 3

☒ **D** 4

(Total for question = 1 mark)

Q2.

10 m of sea water exerts the same pressure as the atmosphere.

A submarine is at a depth of 50 m below the surface of the sea.

Calculate how many times greater the pressure is on the submarine than atmospheric pressure.

(2)

pressure = ... times greater

(Total for question = 2 marks)

Q3.

Figure 15 shows different water levels in two similar water containers with taps.

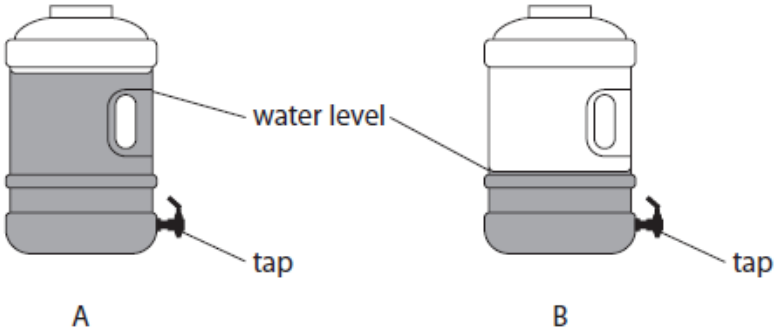

Figure 15

Explain why the water runs out of the tap of container A faster than out of the tap of container B.

(2)

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(Total for question = 2 marks)

Q4.

Figure 9 shows a 10 N weight hanging from a spring.

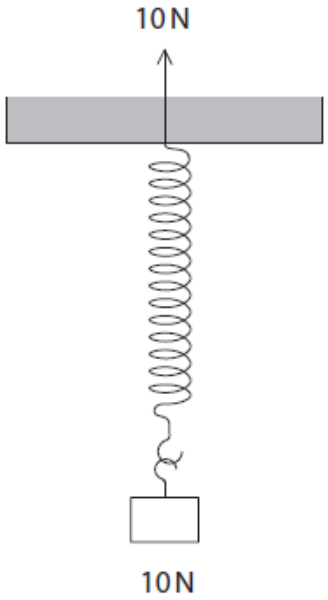

Figure 9

One of the forces acting to stretch the spring is shown in Figure 9.

Complete Figure 9 by adding an arrow to show the other force acting to stretch the spring.

(2)

(Total for question = 2 marks)

Q5.

The graph in Figure 14 shows the variation in atmospheric pressure with the height above sea level.

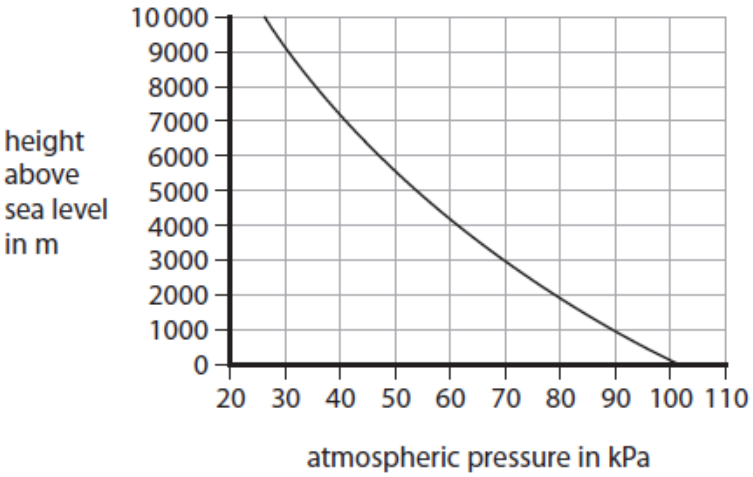

Figure 14

(i) Use the graph to estimate the atmospheric pressure at 3000 m above sea level.

(1)

atmospheric pressure = ... kPa

(ii) Use the graph to estimate the atmospheric pressure at 6000 m above sea level.

(1)

atmospheric pressure = ... kPa

(iii) Suggest a reason why the atmospheric pressure decreases with height above sea level.

(1)

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(Total for question = 3 marks)

Q6.

Figure 4 shows a container of length 6.0 m and width 2.0 m resting on a floor.
The weight of the container is 15 000 N.

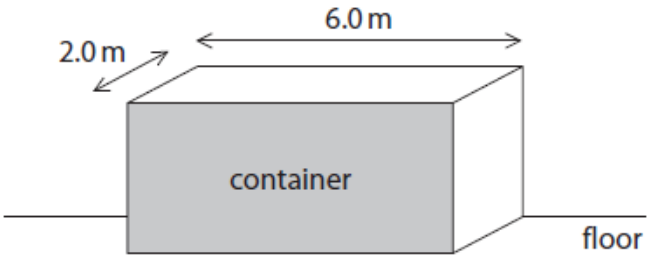

Figure 4

Calculate the pressure that the container exerts on the floor.

Use the equation

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

(3)

pressure of the container on the floor = ... Pa

(Total for question = 3 marks)

Q7.

Another spring has a spring constant of 250 N/m.

Calculate the work done in stretching the spring by 0.30 m.

State the unit.

Use the equation

$$E = ½ \times k \times x^2$$

(3)

work done in stretching the spring = ... unit .....

(Total for question = 3 marks)

Q8.

A balloon is filled with helium when it is on the ground.

The balloon is released and it rises through the atmosphere.

Explain what happens to the size of the balloon as it rises through the atmosphere.

(3)

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(Total for question = 3 marks)

Q9.

A weight of 4.0 N is used to extend a spring.
The extension of the spring is 0.06 m.

(i) Calculate the spring constant, *k*, of the spring.

Use the equation

$$F = k \times x$$

(3)

spring constant = ... N/m

(ii) State what measurements should be made to determine the extension of the spring produced by the 4.0 N weight.

(2)

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(Total for question = 5 marks)

Q10.

* Figure 16 illustrates an effect that can be explained using the ideas of pressure, force and area.

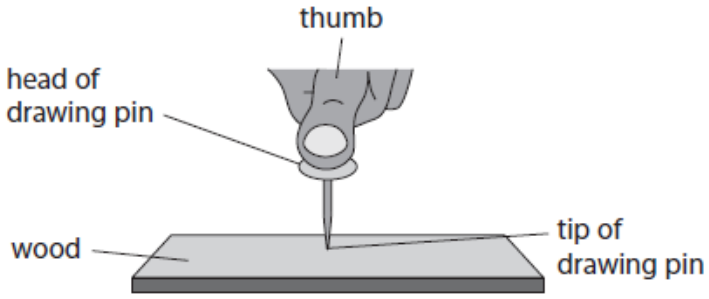

Figure 16

Explain why the tip of the drawing pin goes into the wood but the head of the drawing pin does not go into the thumb.

(6)

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(Total for question = 6 marks)