Questions

Q1.

Which row of the table is correct for water compared to steam?

(1)

		the density of water is	the water molecules are
☒	**A**	bigger	smaller
☒	**B**	smaller	bigger
☒	**C**	bigger	closer together
☒	**D**	smaller	further apart

(Total for question = 1 mark)

Q2.

The volume of 380 g of ice is 410 cm^3.

Calculate the density of the ice in g/cm^3.

(2)

density = ... g/cm^3

(Total for question = 2 marks)

Q3.

A student investigates the density of a copper block and the density of a small stone, as shown in Figure 2.

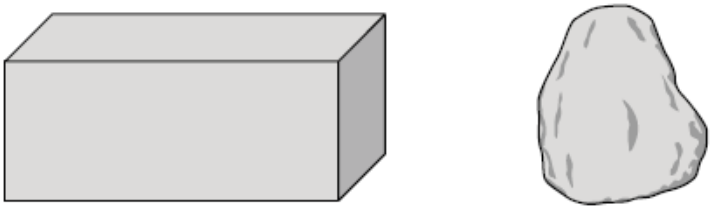

Figure 2

The student calculates the volume of the block as 13 cm^3.

She finds that the mass of the block is 100 g.

Calculate the density of the block.

Use the equation

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

(2)

density = ... g/cm^3

(Total for question = 2 marks)

Q4.

A student investigates the density of a copper block and the density of a small stone, as shown in Figure 2.

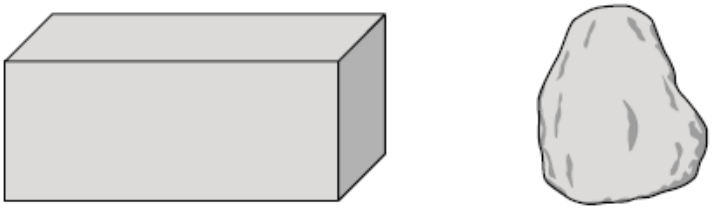

Figure 2

The student found the volume of the copper block by multiplying the area of its base by its height.

The small stone does not have straight sides.

Describe how the student could measure the volume of the small stone. You may use a diagram if it helps your answer.

(3)

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(Total for question = 3 marks)

Q5.

A student measures the density of glass.

The student has

− a bag of marbles, all made from the same type of glass

− a weighing balance

− a plastic measuring cylinder containing water

Describe how the student could find, as accurately as possible, the density of the glass used for the marbles.

(4)

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(Total for question = 4 marks)

Q6.

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 ☒.

A student determines the density of a liquid.

The student puts an empty measuring cylinder on a balance (Figure 5a).
The student then adds liquid to the measuring cylinder (Figure 5b).

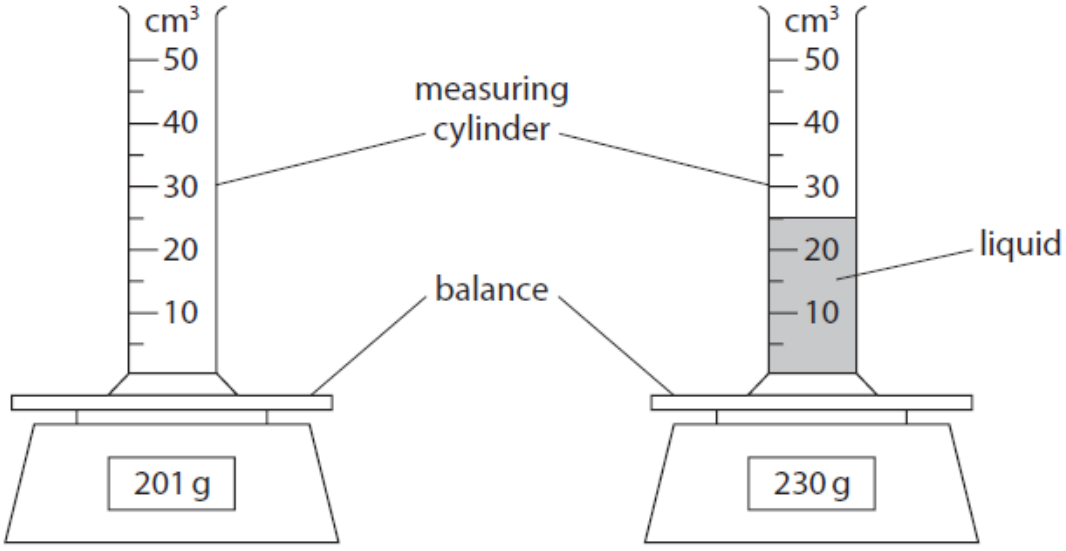

Figure 5a **Figure 5b**

Calculate the mass of liquid added and the volume of liquid added.

Use the information in Figures 5a and 5b.

(i) mass of liquid added = ... g

(1)

(ii) volume of liquid added = ... cm^3

(1)

(iii) Which equation should the student use to calculate the density of the liquid?

(1)

☒ **A** density = mass + volume

☒ **B** density = mass − volume

☒ **C** density = mass × volume

☒ **D** density = $\frac{\text{mass}}{\text{volume}}$

(iv) State **two** improvements the student could make to this investigation.

(2)

1 .....

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2 .....

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(Total for question = 5 marks)

Q7.

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 ☒.

A student determines the density of a liquid.

The student puts an empty measuring cylinder on a balance (Figure 10a).
The student then adds liquid to the measuring cylinder (Figure 10b).

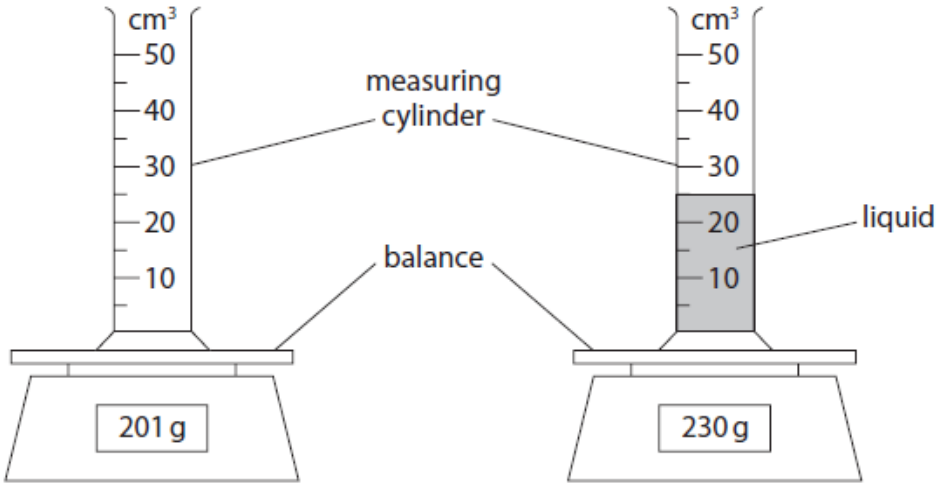

Figure 10a **Figure 10b**

Calculate the mass of liquid added and the volume of liquid added.

Use the information in Figures 10a and 10b.

(i) mass of liquid added = ... g

(1)

(ii) volume of liquid added = ... cm^3

(1)

(iii) Which equation should the student use to calculate the density of the liquid?

(1)

☒ **A** density = mass + volume

☒ **B** density = mass − volume

☒ **C** density = mass × volume

☒ **D** $\text{density} = \frac{\text{mass}}{\text{volume}}$

(iv) State **two** improvements the student could make to this investigation.

(2)

1 .....

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2 .....

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(Total for question = 5 marks)

Q8.

A steel ball has a volume of 3.6 cm^3 and a mass of 28 g.

(i) Calculate the density of steel in kg/m3.

(3)

density = ... kg/m^3

(ii) The steel ball is at a room temperature of 20 °C.

It is then put in a pan of boiling water maintained at 100 °C.

Calculate how much thermal energy the ball gains as its temperature increases from 20 °C to 100 °C.

Specific heat capacity of steel = 510 J/kg °C

Use an equation selected from the list of equations at the end of this paper.

(2)

thermal energy gained = ... J

(iii) The steel ball is put into a furnace where it melts.

Compare the motion of particles in the steel when they are in the solid state with their motion when in the molten (liquid) state.

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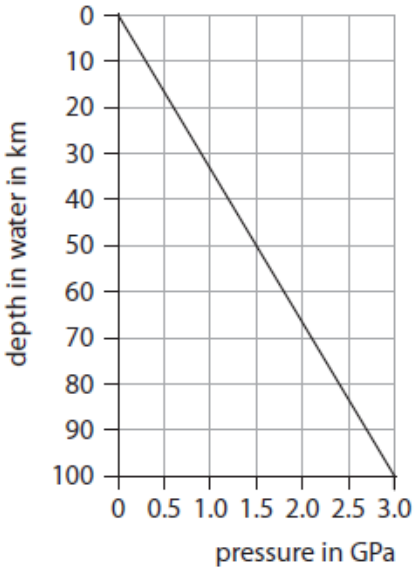
(Total for question = 8 marks)

Q9.

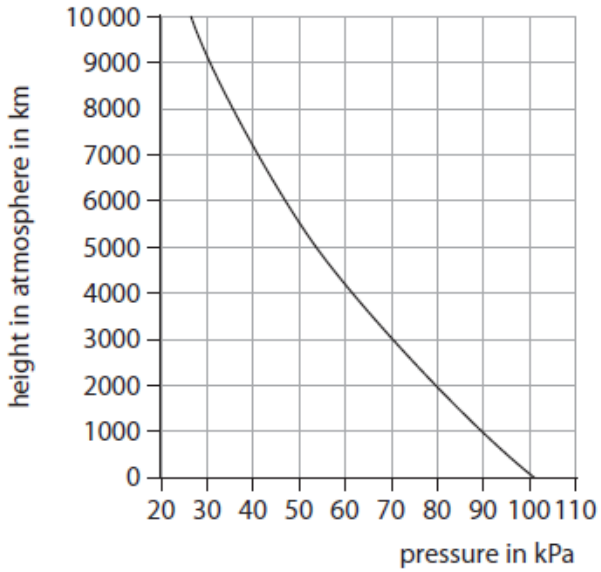
Figure 17 shows information about the pressures in the ocean and in the atmosphere of a distant planet.

Graph A shows the variation of pressure as the depth in the ocean increases.

Graph B shows the variation of pressure as the height in the atmosphere increases.



Graph A



Graph B

Figure 17

(i) Use information from Graph A to obtain a value for the density of the ocean water.

Use an equation selected from the list of equations at the end of this paper.

(4)

density = ... kg/m^3

* (ii) Explain the similarities and differences in the pressure variations shown in graphs A and B.

Your answer should refer to both the particle model (kinetic theory) and to density.

(6)

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(Total for question = 10 marks)