Questions are for both separate science and combined science students
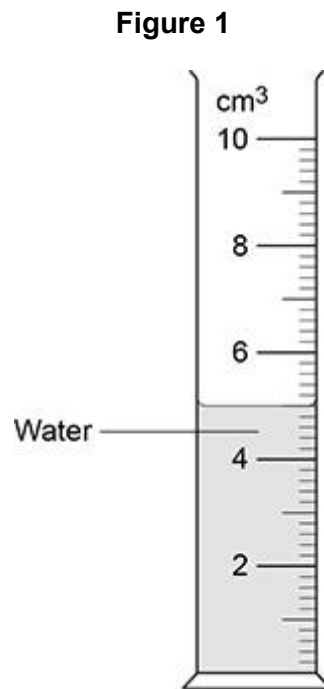
Q1.

Figure 1 shows a measuring cylinder containing some water.

Figure 1

(a) What range of volumes can be measured using the measuring cylinder?

Tick (✓) **one** box.

0.0 to 0.2 cm³ ☐

0.0 to 2.0 cm³ ☐

0.0 to 10.0 cm³ ☐

(1)

A student used the measuring cylinder to measure the volume of a metal ring.

(b) The student tied the metal ring to some very thin string and lowered the ring into the measuring cylinder.

The student could have used thick string instead of thin string.

How would using thick string have affected the measured volume of the metal ring?

Tick (✓) **one** box.

The measured volume would be smaller. ☐

The measured volume would not be affected. ☐

The measured volume would be larger. ☐

(1)

(c) The table below shows the results.

Volume of water in cm³	Volume of water and ring in cm³	Volume of ring in cm³
5.0	5.4	**X**

Calculate value **X** in above table.

_____

_____

X = _____ cm³

(1)

(d) The student measured the volume of the ring three times.

The results were all the same.

Which of the following describes the student s results?

Tick (✓) **one** box.

The results are anomalies. ☐

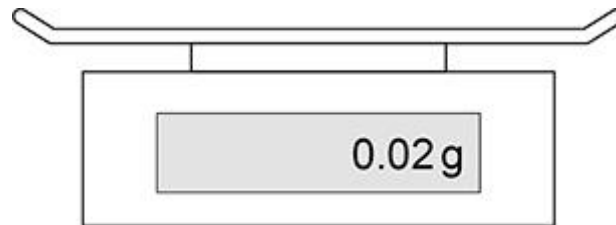The results are repeatable. ☐

The results contain random errors. ☐

(1)

(e)   The student used a balance to measure the mass of the ring.

Figure 2 shows the balance.

Figure 2

The student noticed that the balance had a reading of 0.02 g when there was no object on the balance.

How should the student correct this error **after** the mass of the ring had been measured?

Tick (✓) **one** box.

Add 0.02 to the measurement   ☐

Divide the measurement by 0.02   ☐

Multiply the measurement by 0.02   ☐

Subtract 0.02 from the measurement   ☐

(1)

Use the Physics Equations Sheet to answer parts (f) and (g).

(f)   Write down the equation which links density (ρ), mass (m) and volume (V).

_____

(1)

(g) A different metal ring has a volume of 0.3 cm³.

The density of this ring is 22 g/cm³.

Calculate the mass of this ring.

Give your answer in grams.

_____

_____

_____

_____

_____

Mass = _____ g

(3)

(Total 9 marks)

Q2.

The figure below shows a rock found by a student on a beach.

To help identify the type of rock, the student took measurements to determine its density.

(a) Describe a method the student could use to determine the density of the rock.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

The student determined the density of the rock to be 2.55 ± 0.10 g/cm³.

(b)   What are the maximum and minimum values for the density of the rock?

Maximum density = _____ g/cm³

Minimum density = _____ g/cm³

(1)

(c)   The table below gives the density of five different types of rock.

Type of rock	Density in g/cm³
Basalt	2.90 ± 0.10
Chalk	2.35 ± 0.15
Flint	2.60 ± 0.10
Sandstone	2.20 ± 0.20
Slate	2.90 ± 0.20

Which two types of rock in above table could be the type of rock the student had?

Tick (✓) **one** box.

Basalt or chalk   ☐

Chalk or flint   ☐

Flint or sandstone   ☐

Sandstone or slate   ☐

(1)

(d)   The student only took one set of measurements to determine the density of the rock.

Explain why taking the measurements more than once may improve the accuracy of the density value.

_____

_____

_____

_____

(2)
(Total 10 marks)