The particle model

Q1.(2018)

Which of the following is **not** part of the atomic model?

A Almost all of an atom's mass is contained in the nucleus.

B An atom's nucleus contains positive neutrons.

C An atom's nucleus is located in the centre of the atom.

D An atom's nucleus is surrounded by electrons.

Your answer ☐ **[1]**

Q2.(2018)

A student has a wooden cube.

Explain how she could find the density of the wooden cube.

Include the measurements needed.

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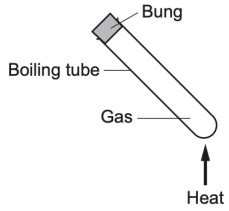
..... **[3]**

Q3.(2019)

A sealed boiling tube contains gas.



The boiling tube is heated.

What happens?

A The particles in the gas evaporate.

B The particles in the gas expand.

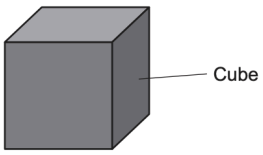
C The particles in the gas move faster.

D The particles in the gas move slower.

Your answer ☐ **[1]**

Q4.a(2019)

A student is given a **solid** metal cube.



(i) Explain how the student can use a ruler to calculate the volume of the metal cube.

.....

.....

..... **[2]**

Q4.b(2019)

The metal cube has a volume of 125 cm^3 and a mass of 850 g.

Calculate the density of the metal cube.

Use the equation: density = mass ÷ volume

Density = ... g/cm^3 **[2]**

Q5.a(2019)

The student wants to calculate the density of a stone. The stone has an irregular shape.

(i) Suggest **one** piece of apparatus that she can use to measure the **mass** of the stone.

..... **[1]**

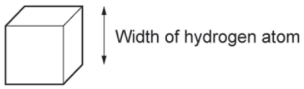
Q5.b(2019)

Suggest **one** piece of apparatus that she can use to **measure** the **volume** of the stone.

..... **[1]**

Q6.(2020)

A physics student says a hydrogen atom is like a cube.



What is the **approximate** volume of this hydrogen atom?

A $1 \times 10^{-30}\,m^3$

B $1 \times 10^{-27}\,m^3$

C $1 \times 10^{-10}\,m^3$

D $1 \times 10^{-9}\,m^3$

Your answer ☐ **[1]**

Q7.(2020)

Which statement describes an atom?

A The nucleus is smaller than the atom and contains no mass.

B The nucleus is smaller than the atom and contains most of the mass.

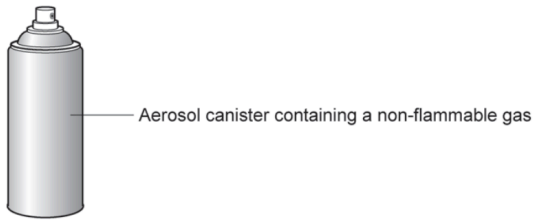
C The nucleus orbits the electrons and contains most of the mass.

D The nucleus orbits the protons and contains electrons.

Your answer ☐ **[1]**

Q8.(2020)

An aerosol canister contains a non-flammable gas at high pressure. The aerosol canister should **not** be exposed to high temperatures.



Complete the sentences using the words below.

You can use each word once, more than once, or not at all.

accelerate **collide** **faster** **pressure**

slower **temperature** **vibrate** **volume**

When the temperature of the gas in the aerosol canister increases, gas particles move

..... .

The gas particles ..... with the sides of the aerosol canister more often.

The ..... of the gas increases, so the aerosol canister may explode.

[3]

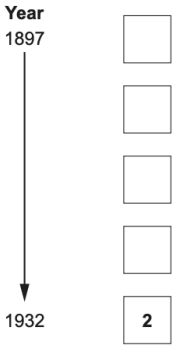
Q9.a(2021)

Here are some events in atomic theory:

1	Thomson	Discovered the electron. Published findings in a scientific journal.
2	Chadwick	Discovered the neutron.
3	Bohr	Suggested electron shells after a science conference.
4	Rutherford	Did experiments showing the atom had a nucleus.
5	Thomson	Published the 'plum pudding' model in a scientific journal.

(i) Place the events in the order they occurred.

Write the numbers in the boxes below. One has been done for you.



[2]

Q9.b(2021)

The events were peer reviewed **and** communicated to others.

Suggest why **both** are important in science.

Peer review .....

.....

Communication .....

.....

[2]

Q10.a(2021)

Table 16.1 gives the density of different materials.

Material	State	Density (kg/m^3)
Argon	Gas	1.45
Copper	Solid	8960
Ethanol	Liquid	789
Iron	Solid	7870
Oxygen	Gas	1.31
Water	Liquid	998

Table 16.1

(i) Describe any trends in the data in **Table 16.1**.

.....

.....

..... **[2]**

Q10.b(2021)

Explain the difference in density between solids and liquids.

You may draw diagrams to help your answer.

.....

.....

..... **[2]**

Q11.(2022)

A student records the time it takes to run three distances. The table shows their results.

Distance (m)	25.2	25.0	25.1
Time taken (s)	40.0	41.6	42.4

How many significant figures is the student using?

A 1

B 2

C 3

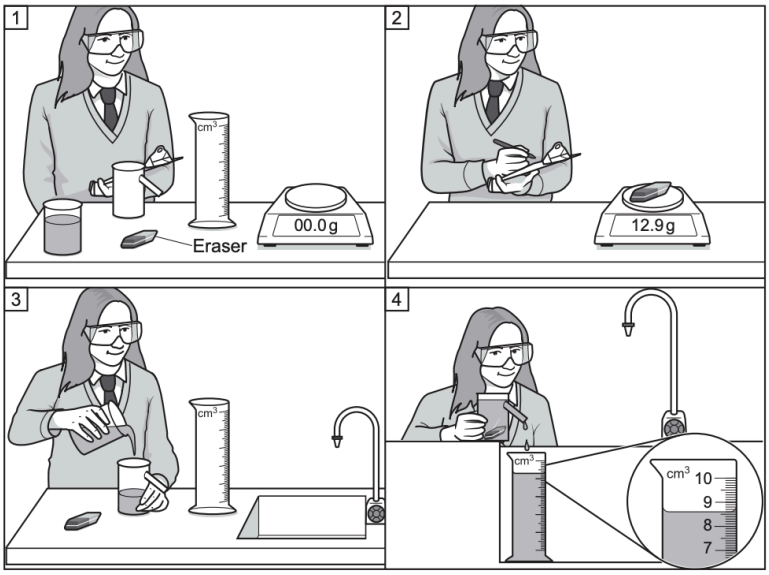
D 4

Your answer ☐ **[1]**

Q12.(2022)

A student does an experiment to find out the density of an eraser.
The eraser has an irregular shape.

The diagrams show the student's method:



Describe how the student works out the **density** of the eraser.
Use the Data Sheet and include calculations in your answer.

Describe how the student can improve their method.

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..... **[6]**

Q13.(2022)

A student calculates the specific heat capacity of water.
The student does **one** experiment and gets this result:

- Student's value = 4250 J / kg °C.
- Textbook value = 4200 J / kg °C.

Complete the sentence below.
Use one of the words.

Accurate	**Precise**	**Reliable**	**Repeatable**	**Systematic**

The student's value is ..... . **[1]**

Q14.(2023)

Which substance listed in the table has the highest **density**?

Substance	Mass (kg)	Volume (cm^3)
A	1.0	1.5
B	1.0	3.0
C	1.0	4.5
D	1.0	6.0

Your answer ☐ **[1]**

Q15.(2023)

How much of the total mass of a hydrogen atom is made up by the nucleus?

A None of the mass

B Half of the mass

C Almost all of the mass

D All of the mass

Your answer ☐ **[1]**

Q16.(2023)

Which new feature of the atomic model did Niels Bohr suggest?

A Electrons are in stable shells.

B Electrons orbit a nucleus.

C The atom has a nucleus.

D The nucleus is positive.

Your answer ☐ **[1]**

Q17.(2023)

Two rooms have the same fixed volume. They contain identical gases at the same pressure.

Room **H** is at a higher temperature than room **L**.

Which statement is correct?

A The particles are moving at the same speed in both rooms.

B The particles are moving faster in room **H**.

C The particles are moving faster in room **L**.

D The particles are not moving in either room.

Your answer ☐ **[1]**

Q18.(2024)

Which two instruments are used to measure the **density** of a rectangular glass block?

A A measuring cylinder and a ruler

B A protractor and a ruler

C A protractor and an electronic balance

D A ruler and an electronic balance

Your answer ☐ **[1]**

Q19.(2024)

Different scientists have contributed to the model of the atom.

What is the order of each scientist's contribution from the oldest to the newest?

Oldest ⟶ Newest

A Bohr, Rutherford, Thomson

B Rutherford, Bohr, Thomson

C Thomson, Bohr, Rutherford

D Thomson, Rutherford, Bohr

Your answer ☐ **[1]**