AQA - Changes of state and particle model – GCSE Physics

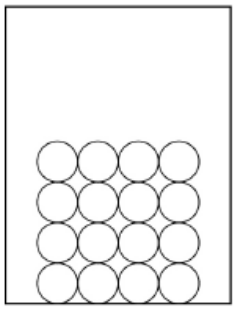
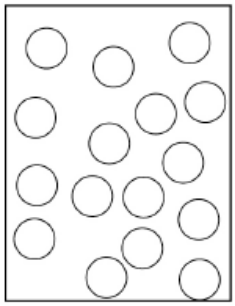
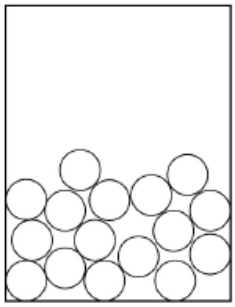
1. June/2021/Paper_1F/No.1(1.1_1.4),1.6

0 1 . 1 A student investigated the three states of matter.

The arrangement of particles in the three states of matter are different.

Draw **one** line from each particle arrangement to the state of matter.

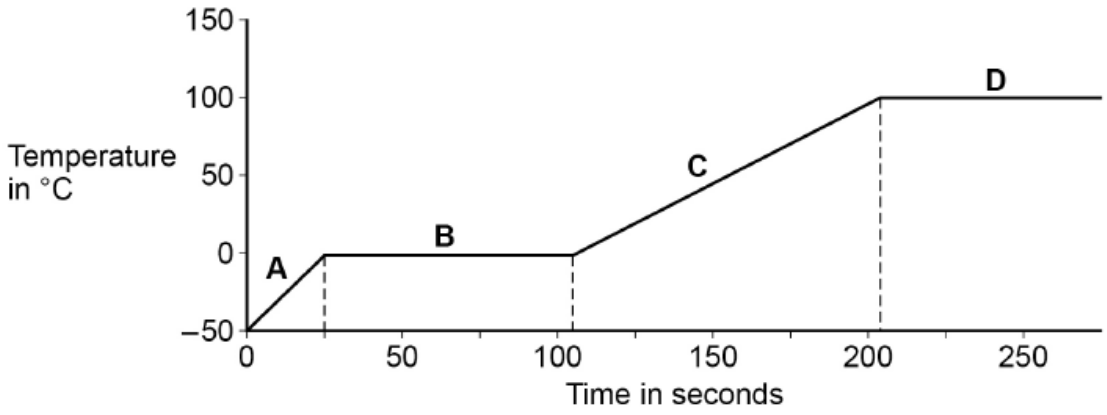
[2 marks]

Particle arrangement	**State of matter**
	Solid
	Liquid
	Gas

A large lump of ice was heated and changed state.

Figure 1 shows how the temperature varied with time.

Figure 1



0 1 . 2 Which part of **Figure 1** shows when the ice was melting?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 1 . 3 Which part of **Figure 1** shows when the water was boiling?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 1 . 4 Which property of the water particles changes as the temperature of the water increases?

[1 mark]

Tick (✓) **one** box.

The kinetic energy of the particles ☐

The mass of each particle ☐

The number of particles ☐

0 1 . 6 Complete the sentence.

Choose the answer from the box.

[1 mark]

condenses	**evaporates**	**ionises**	**sublimates**

A substance is heated and changes directly from a solid to a gas.

The substance _____ .

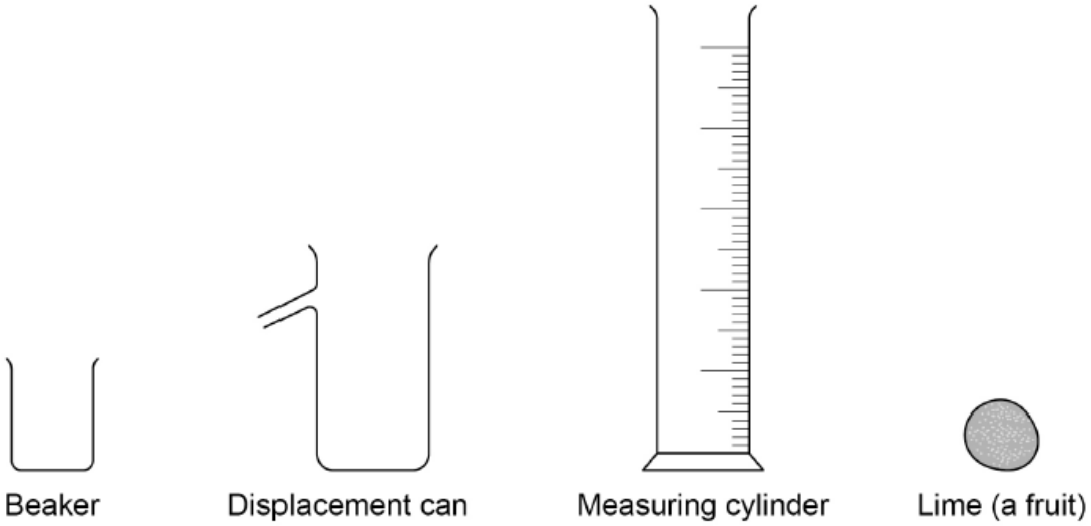
2. June/2021/Paper_1F/No.3

0 3 A student investigated the density of different fruits.

To determine the density of each fruit, the student measured the volume of each fruit.

Figure 3 shows the equipment the student could have used.

Figure 3



0 3 . 1 Describe a method the student could have used to measure the volume of the lime.

[4 marks]

0 3 . 2 The student measured the volume of each fruit three times and then calculated a mean value.

The three measurements for a grape were

$2.1\ cm^3$ $2.1\ cm^3$ $2.4\ cm^3$

Calculate the mean value.

[2 marks]

Mean value = _____ cm^3

0 3 . 3 What are the advantages of taking three measurements and calculating a mean value?

[2 marks]

Tick (✓) **two** boxes.

- Allows anomalous results to be identified and ignored. ☐
- Improves the resolution of the volume measurement. ☐
- Increases the precision of the measured volumes. ☐
- Reduces the effect of random errors when using the equipment. ☐
- Stops all types of error when using the equipment. ☐

0 3 . 4 The mass of an apple was 84.0 g.

The volume of the apple was 120 cm^3.

Calculate the density of the apple.

Give your answer in g/cm^3.

Use the equation:

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

[2 marks]

Density = _____ g/cm^3

3. June/2021/Paper_1H/No.4

0 4 A student investigated the density of different fruits.

Table 1 shows the results.

Table 1

Fruit	Density in g/cm^3
Apple	0.68
Kiwi	1.03
Lemon	0.95
Lime	1.05

0 4 . 1 The student determined the volume of each fruit using a displacement can and a measuring cylinder.

What other piece of equipment would the student need to determine the density of each fruit?

[1 mark]

0 4 . 2 Write down the equation which links density (ρ), mass (m) and volume (V).

[1 mark]

0 4 . 3 The mass of the apple was 85 g.

The density of the apple was 0.68 g/cm^3.

Calculate the volume of the apple.

Give your answer in cm^3.

[3 marks]

Volume = _____ cm^3

0 4 . 4 The student only measured the volume of each fruit once.

The volume measurements **cannot** be used to show that the method to measure volume gives precise readings.

Give the reason why.

[1 mark]

4. June/2021/Paper_1H/No.11

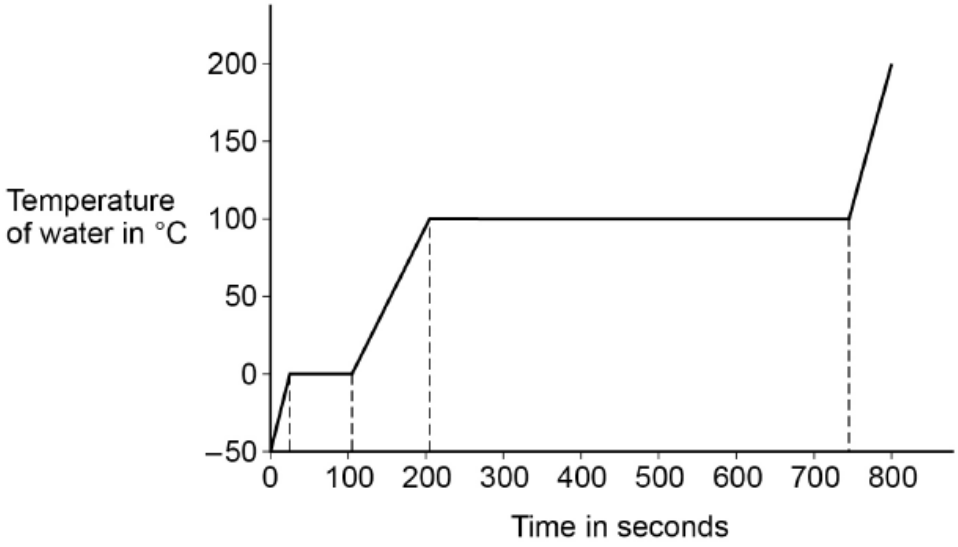
1 1 A student investigated how the temperature of a lump of ice varied as the ice was heated.

The student recorded the temperature until the ice melted and then the water produced boiled.

Figure 17 shows the student's results.

The power output of the heater was constant.

Figure 17



1 1 . 1 The specific heat capacity of ice is less than the specific heat capacity of water.

Explain how **Figure 17** shows this.

[2 marks]

1 1 . 2 The specific latent heat of fusion of ice is less than the specific latent heat of vaporisation of water.

Explain how **Figure 17** shows this.

[2 marks]

1 1 . 3 A second student did the same investigation and recorded the temperature until the water produced boiled.

In the second student's investigation more thermal energy was transferred to the surroundings.

Describe **two** ways the results of the experiment in **Figure 17** would have been different.

[2 marks]

1

2

1 1 . 4 When the water was boiling, 0.030 kg of water turned into steam.

The energy transferred to the water was 69 kJ.

Calculate the specific latent heat of vaporisation of water.

Give the unit.

[5 marks]

Specific latent heat of vaporisation = _____

Unit _____