



**Read the exam style question carefully, then fill in each section below.**

**Question:**

A scientist cools a sample of Argon from room temperature ( $22\text{ }^{\circ}\text{C}$ ) to  $-185\text{ }^{\circ}\text{C}$ . The Argon changed from a gas to a liquid to a solid.

Explain the changes in the arrangement and movement of particles as the Argon was cooled. **(6)**

**Section 1: At first glance**

1. What **command words** are used in this question? Circle them clearly.
2. **Underline the key information** in the question above.
2. **How many marks** is this question worth?

**Section 2: Thinking ahead**

Read the question again.

What do you need to know in order to answer this question really well?

Can you split the question into two or more parts?

Are there any labelled diagrams that might help you to show your answer?

What are the key words that you should include in your answer?

**Section 4: Space to plan**

Use this space to plan your answer.



## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## Section 5: Mark Scheme

Level	Mark	Description of answer
3	5-6	The answer is a correct, detailed and logical sequence, including comments on both the arrangement <b>and</b> movement of particles in each state of matter and an <b>explanation</b> of why.
2	3-4	The answer includes correct comments about either the arrangement of particles <b>or</b> the movement of particles in <b>all</b> states of matter, <b>or</b> comments on the arrangement <b>and</b> movement in <b>two</b> states of matter.
1	1-2	Some correct points are made on either the arrangement or movement of particles.
0	0	No relevant content is included

Suggested content:

**Arrangement of particles:**

- Particles move closer together
- Density increases
- Arrangement changes from being spread apart to being close together but randomly arranged
- As it becomes a solid, particles are held in a regular arrangement

**Movement of particles:**

- Particles slow down
- Particles change from moving at random speeds to moving freely to vibrating

**Explanation:**

- As it cools, internal energy decreases
- (Kinetic) energy decreases with temperature
- (Potential) energy decreases during the changes of state
- When particles lose energy, they can no longer overcome forces of attraction, so they are held closer together