

Combined science - Physics - Key stage 4 -Particle Model of Matter

Internal energy Worksheet

Mr Charman



Exam question



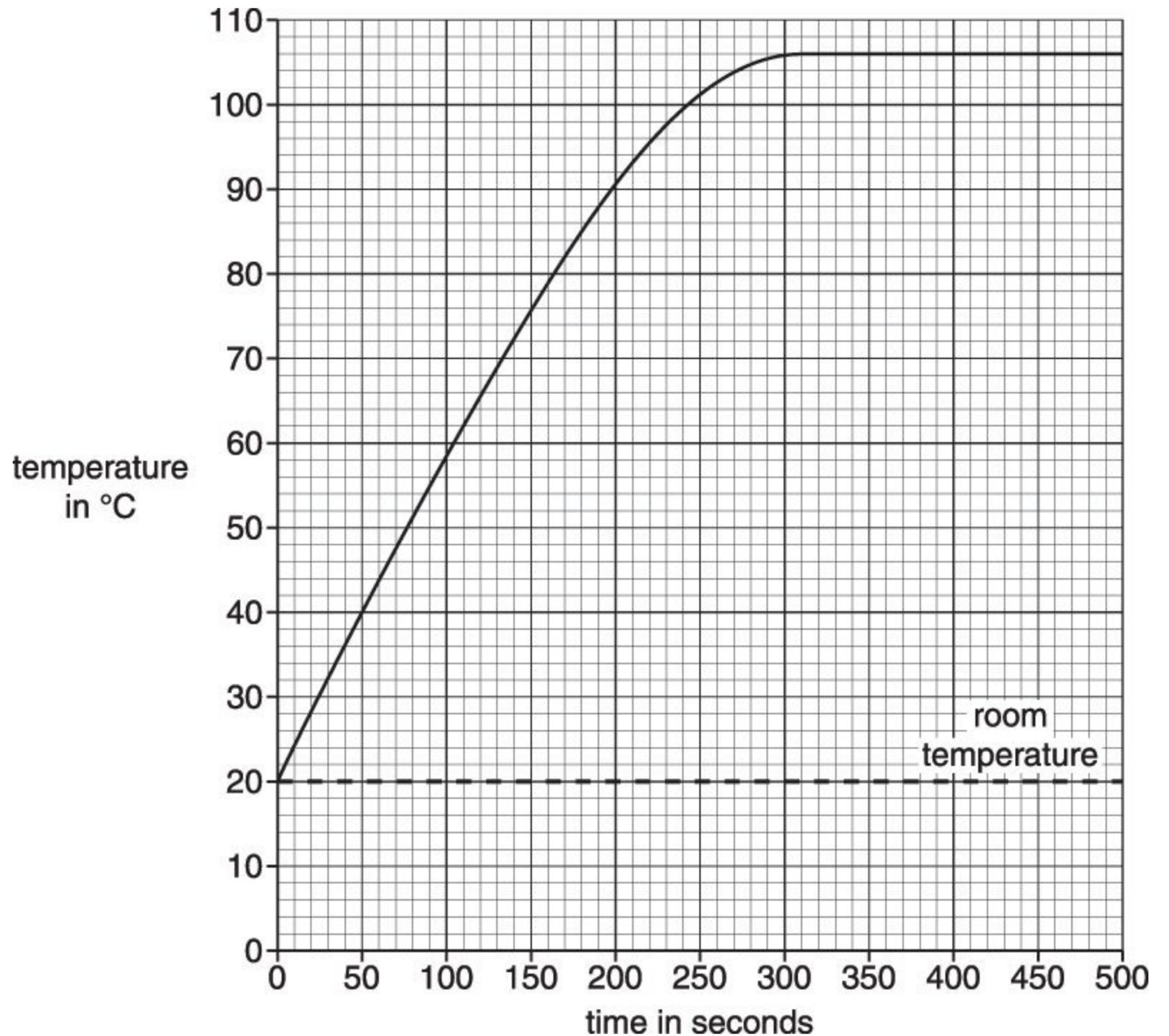
Exam question

1(a). Layla heats a beaker containing a liquid and records its temperature. Look at the graph of her results.

Layla concludes that the liquid boiled during the experiment. How does the graph show this?

(b). What is the boiling point of the liquid?

answer °C.



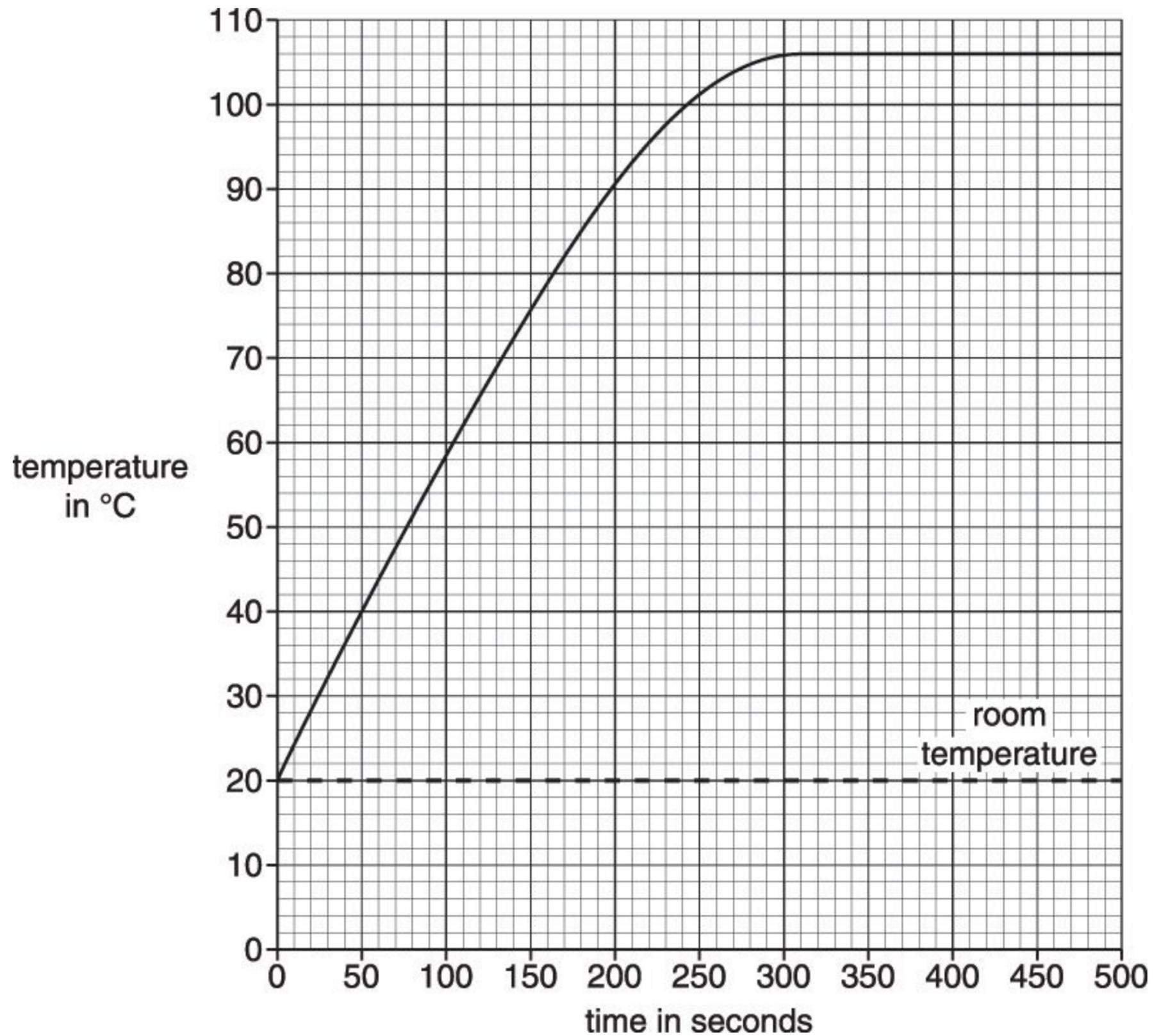
Exam question

2)

Write down the time interval during which all of the energy supplied was used to change the state of the liquid, and explain how the energy supplied causes this change of state.

Time interval is from seconds to seconds

Explanation.....
.....
.....



Exam question

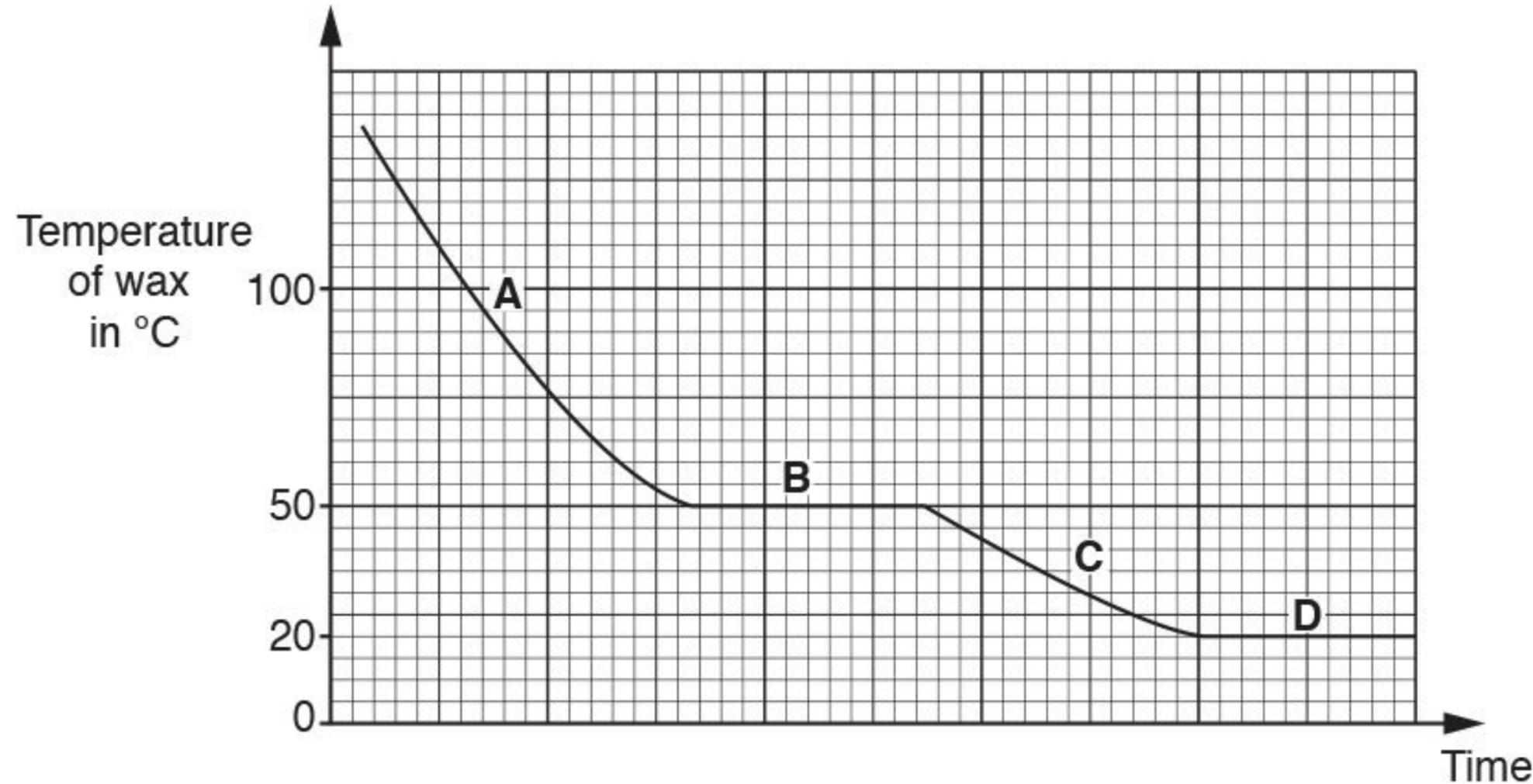
3)a)

Fin lets some liquid wax cool until it reaches room temperature at 20°C .

He measures the temperature of the wax as it cools. Look at the graph of his results.

Explain what happens at B on the graph.

b) Explain why the graph is constant at D.



OCR, Gateway Physics A, Paper B751/01, June 2017.



Answers



Review

1)a) the temperature stays constant after 300s / 5 min / at 106 °C (1)

1)b) 106 °C (1)

2)

300 seconds to 500 seconds (1)

energy used to break bonds between molecules (1)

allow overcome intermolecular forces of attraction (1)



Review

3)a)

freezing (1)

allow changing from liquid to solid (1)

Energy is given off due to a change in state (1)

allow temperature staying the same (1)

b) any two from:

at room temperature (1)

temperature difference is zero (1)

no (net) transfer of energy (1)



In lesson questions



Pause the video to complete your task

Answer the following questions:

1. Which object has a higher temperature?
2. Which object has a larger thermal energy store?

Resume once you're finished



Independent task

Copy and complete the definitions

- Thermal Energy store - the _____ energy of an object due to the _____ energy of its particles.
- Temperature - a measure of the _____ kinetic _____ of the particles.
- Internal energy - the sum of _____ energy and _____ energy store of the particles.

Answer the following questions

1. Explain the difference between heat and temperature.
2. What does absolute zero mean?



Pause the video to complete your task

1. Write the definition of internal energy.
2. Which energy store of particles does increasing temperature affect?
3. Which energy store of particles does changing state affect?
4. List the two changes of state that occur when heating a solid substance.

Resume once you're finished



Independent task

Sketch a graph of temperature against time for ice being heated so that it undergoes two changes of state. You should:

- Label on the graph the two changes of state
- Label points on the graph where the kinetic energy store of the particles is increasing
- Label points on the graph where the potential energy store of the particles is increasing.



Answers



Review

- The boiling water has a **higher temperature** compared to the iceberg.
- The iceberg has a **larger thermal energy store** compared to boiling water.
- This is because the iceberg has a much **larger mass**, so it contains **more atoms**.



Review

Copy and complete the definitions

- Thermal Energy store - the **total** energy of an object due to the **kinetic** energy of its particles.
 - Temperature - a measure of the **average** kinetic **energy** of the particles.
 - Internal energy - the sum of **kinetic** energy and **potential** energy store of the particles.
1. Explain the difference between heat and temperature. **Temperature measures average kinetic energy of molecules. Heat refers to the thermal store of molecules and is the sum of their kinetic energies.**
 2. What does absolute zero mean? **The point at which no object has any energy in its kinetic store**



Review

1. Write the definition of internal energy. **The sum of the kinetic energy and potential energy stores of the particles.**
2. Which energy store of particles does increasing temperature affect? **Kinetic**
3. Which energy store of particles does changing state affect? **Potential**
4. List the two changes of state that occur when heating a solid substance.
Melting and boiling

