

Heating, melting and boiling: energy calculations

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

Answer all questions. Show your working and give units. Use $c(\text{water}) = 4200 \text{ J}/(\text{kg } ^\circ\text{C})$. A calculator is allowed. The paper is out of 20 marks.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE P3, IGCSE 2.2

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Definition (2 marks)

- State what is meant by specific heat capacity. (1 mark)
- State the unit of specific latent heat. (1 mark)

Question 2 Warming water (3 marks)

Diego in Texas heats 1.8 kg of water from 18°C to 63°C . Calculate the energy needed. Use $c = 4200 \text{ J}/(\text{kg } ^\circ\text{C})$. (3 marks)

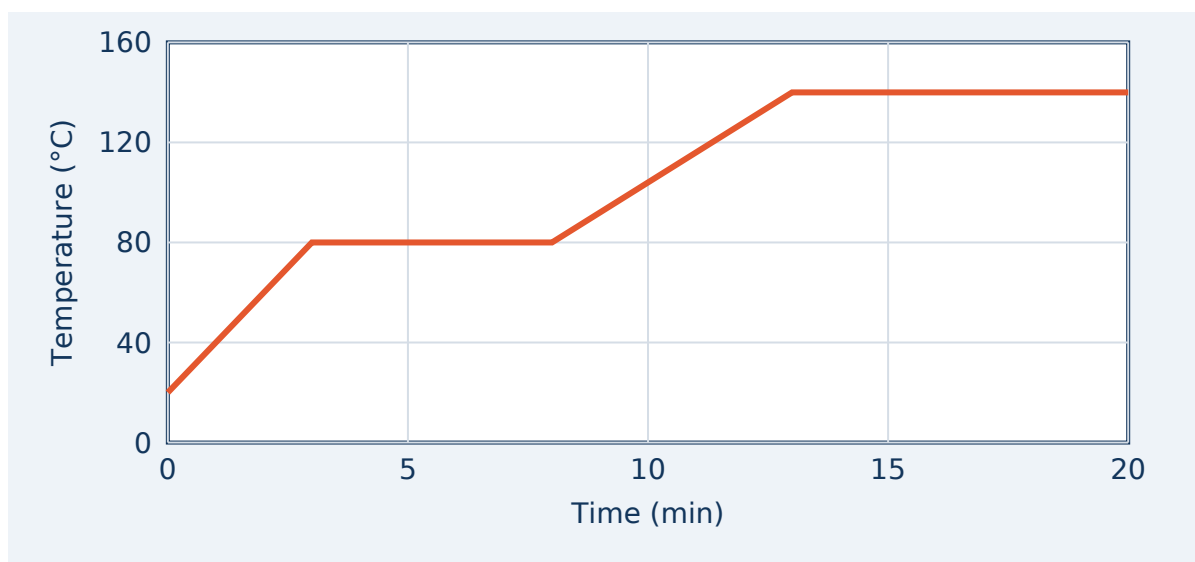
Question 3 Constant temperature (2 marks)

Explain why the temperature of boiling water stays at 100°C although the heater keeps supplying energy. (2 marks)

Question 4 Melting wax (3 marks)

A 0.35 kg block of wax at its melting point needs $7.0 \times 10^4 \text{ J}$ to melt completely. Calculate the specific latent heat of fusion of the wax. (3 marks)

Question 5 Reading the graph (4 marks)



Heating curve of a pure substance.

- State the melting point of the substance. (1 mark)
- State the boiling point. (1 mark)
- Calculate how long the substance took to melt. (1 mark)
- The heater power and mass stay the same. Explain why the graph is less steep in the liquid state than in the solid state. (1 mark)

Question 6 Kettle time (3 marks)

A 2.5 kW heater warms 4.0 kg of water from 20 °C to 45 °C. Ignoring losses, calculate the time taken. (3 marks)

Question 7 Steam burns (2 marks)

Explain why steam at 100 °C causes a more serious burn than water at 100 °C. (2 marks)

Question 8 Coolant (1 mark)

Give one reason why water is used to cool engines. (1 mark)