

Required Practical Specific Heat Capacity

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

State the measurements needed to find the specific heat capacity of the block, and the instrument for each. (4 marks)

Step 1 · Mass

Mass of the block, using a top-pan balance (or read from the block).

Step 2 · Temperature

Starting and final temperature, using a thermometer (or temperature probe and data logger).

Step 3 · Energy

Energy supplied, using a joulemeter, or a voltmeter, ammeter and stopwatch ($E = V I t$).

Answer: Mass (balance), temperature change (thermometer), energy (joulemeter or V , I and t)

Check: These are the three quantities in $c = \Delta E \div (m \Delta \theta)$.

2. Now try one with the steps

A joulemeter reads 1250 J at the start and 30 050 J at the end. Calculate the energy supplied. (1 mark)

Step 1 · Subtract

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State the two quantities that are measured while the block is being heated. [2]

2. Name the meter that measures the energy supplied to the heater directly. [1]

3. Explain why the block is wrapped in insulation. [2]

4. Suggest why a few drops of water are put into the hole that holds the thermometer. [1]

5. Give one safety precaution for this practical. [1]
-
-
6. A 50 W heater is switched on for 10 minutes. Calculate the energy it supplies. Give your answer in joules. [2]
-
-
7. The heater runs at 12 V and 3.5 A for 400 s. Calculate the energy supplied. Give your answer in joules. [2]
-
-
8. That energy (16 800 J) raises the temperature of a 1.0 kg block by 17.5 °C. Calculate the specific heat capacity in J/kg °C. [3]
-
-
-
9. The accepted value for the metal is 900 J/kg °C. Calculate the percentage difference between 960 J/kg °C and the accepted value. Give your answer to 2 significant figures. [2]
-
-
10. Explain why values measured in this practical are usually higher than the accepted value. [2]
-
-
11. Suggest why the temperature of the block keeps rising for a short time after the heater is switched off. [2]
-
-
12. A graph of temperature (°C) against energy supplied (J) for a 1.0 kg block has a gradient of 0.0011 °C/J. Calculate the specific heat capacity in J/kg °C to 2 significant figures. [3]
-
-
-
13. Explain why a thermometer with a resolution of 0.1 °C is better than one with a resolution of 1 °C here. [2]
-
-

14. A student plans to use a 0.50 kg block instead of a 1.0 kg block with the same heater and time. [3]
Evaluate this change.

4. Before you hand it in

Using the time in minutes in $E = P t$

Convert minutes to seconds: 10 minutes = 600 s.

Saying the result was 'inaccurate because of human error'

Name the actual cause: energy dissipated to the surroundings, poor thermal contact, or the heater warming up first.

Thinking energy losses make the measured c lower

Losses mean the energy supplied is more than the block received, so $c = \Delta E \div (m\Delta\theta)$ comes out too high.

Using $c = 1 \div \text{gradient without the mass}$

$c = 1 \div (m \times \text{gradient})$. With a 1 kg block the numbers look the same, but not with any other mass.