

GCSE heating and changes of state

Questions · Set 42 · Selected AQA 8463 / OCR Gateway J249 skills
Treat the given values as exact unless an uncertainty is stated.

Question 1

Heat 0.7 kg of a substance through 27 °C. Its specific heat capacity is 500 J kg⁻¹ °C⁻¹. Calculate the energy transferred to it. Give your answer to 3 significant figures.

gcse-thermal / energy / v1.0.0 / seed 42

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

Question 2

8640 J transferred to a 0.6 kg sample raises its temperature by 16 °C without a change of state. Find its specific heat capacity. Give your answer to 3 significant figures.

gcse-thermal / capacity / v1.0.0 / seed 104771

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

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Question 3

Transfer 21000 J to 0.5 kg of a substance with specific heat capacity $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$. There is no change of state. Find the temperature rise. Give your answer to 3 significant figures.

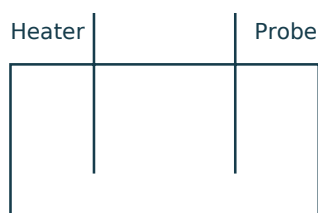
gcse-thermal / temperature-rise / v1.0.0 / seed 209500

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

Question 4

A heater transfers energy to a 0.6 kg block at 40 W for 144 s. The block warms by $24 \text{ }^{\circ}\text{C}$. Ignore energy transferred to the surroundings and apparatus. Find its specific heat capacity. Give your answer to 3 significant figures.

Heater 40 W for 144 s



Block 0.6 kg; rise $24 \text{ }^{\circ}\text{C}$

gcse-thermal / heater / v1.0.0 / seed 314229

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

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Question 5

0.5 kg of a solid is already at its melting temperature. Its specific latent heat of fusion is 200000 J kg^{-1} . Find the energy needed to melt it completely at constant temperature. Give your answer to 3 significant figures.

gcse-thermal / latent-energy / v1.0.0 / seed 418958

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

Question 6

A heater supplies 16200 J . Of this, 8100 J goes to the surroundings and apparatus. The remaining energy warms a 0.9 kg sample by 18°C . Find its specific heat capacity. Give your answer to 3 significant figures.

gcse-thermal / heat-loss / v1.0.0 / seed 523687

Check this question online: [physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/](https://www.physicshelp.co.uk/gcse/specific-heat-capacity-latent-heat/)

Worked answers

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Keep intermediate values unrounded. Final answers use 3 significant figures.

Question 1

$$E = 0.7 \times 500 \times 27 \text{ J.}$$

Answer: $9.45 \times 10^3 \text{ J}$ (3 significant figures).

Question 2

$$c = 8640 / (0.6 \times 16) \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}.$$

Answer: $9.00 \times 10^2 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ (3 significant figures).

Question 3

$$\Delta\theta = 21000 / (0.5 \times 4200) \text{ }^{\circ}\text{C.}$$

Answer: $1.00 \times 10^1 \text{ }^{\circ}\text{C}$ (3 significant figures).

Question 4

$$E = 40 \times 144 = 5760 \text{ J.}$$

$$c = 5760 / (0.6 \times 24) \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}.$$

Answer: $4.00 \times 10^2 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ (3 significant figures).

Question 5

$$E = 0.5 \times 200000 \text{ J.}$$

Answer: $1.00 \times 10^5 \text{ J}$ (3 significant figures).

Question 6

$$E_{\text{sample}} = 16200 - 8100 = 8100 \text{ J.}$$

$$c = 8100 / (0.9 \times 18) \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}.$$

Answer: $5.00 \times 10^2 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ (3 significant figures).