

CLASS 11

PHYSICS

EXTRA QUESTIONS

Class 11 Physics Chapter 10 Thermal Properties of Matter – Extra Questions with Answers

Temperature scales, specific heat, and modes of heat transfer are the recurring themes tested from this chapter, starting with conversions like 100°C into Kelvin. The questions below work through calorimetry, expansion coefficients, and radiation in short, exam-style answers.

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Very Short Answer Questions (1 mark)

Q1. Convert 100°C to Kelvin.

Ans: $K=100+273.15=373.15\text{ K}$.

Q2. What is the SI unit of specific heat capacity?

Ans: $\text{J}/(\text{kg}\cdot\text{K})$.

Q3. Which mode of heat transfer does not require a medium?

Ans: Radiation.

Q4. Write the relation between linear (α) and volume (γ) expansion coefficients.

Ans: $\gamma=3\alpha$.

Q5. What is latent heat?

Ans: The heat absorbed or released per unit mass during a phase change at constant temperature.

Short Answer Questions (2–3 marks)

Q6. A metal rod of length 2 m and $\alpha=1.2\times 10^{-5}/^{\circ}\text{C}$ is heated through 50°C . Find its increase in length.

Ans: $\Delta L=L\alpha\Delta T=2(1.2\times 10^{-5})(50)=1.2\times 10^{-3}\text{ m}=1.2\text{ mm}$.

Q7. How much heat is needed to raise the temperature of 2 kg of water by 10°C ($c_{\text{water}}=4200\text{ J/kg}\cdot\text{K}$)?

Ans: $Q=mc\Delta T=2(4200)(10)=84000\text{ J}$.

Q8. Find the heat needed to melt 0.5 kg of ice at 0°C ($L_{\text{fusion}}=3.34\times 10^5\text{ J/kg}$).

Ans: $Q=mL=0.5(3.34\times 10^5)=1.67\times 10^5\text{ J}$.

Higher-Order Thinking / Application Questions

Q9. 0.1 kg of steam at 100°C is passed into 1 kg of water at 20°C . Using the principle of calorimetry (and given $L_{\text{vaporisation}}=2.26\times 10^6\text{ J/kg}$, $c_{\text{water}}=4200\text{ J/kg}\cdot\text{K}$), set up (without fully solving) the heat balance equation, explaining each term.

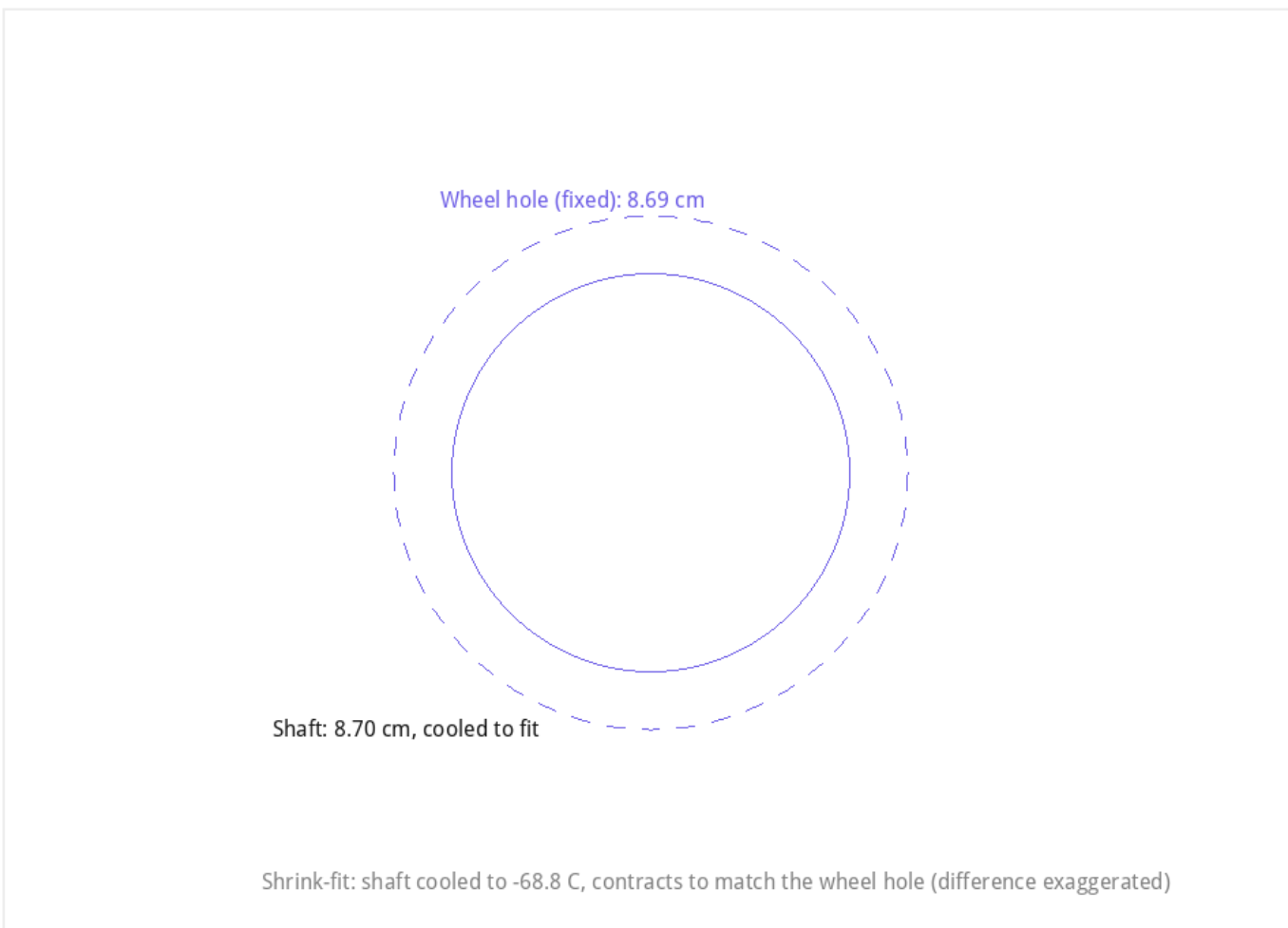
Ans: Heat lost by steam condensing and then cooling = Heat gained by water in warming up. Heat lost = $m_{\text{steam}}L_{\text{vap}} + m_{\text{steam}}c_{\text{water}}(100-T_f)$, where the first term is the heat released when steam condenses to water at 100°C , and the second term is heat released as this condensed water cools from 100°C to the final temperature T_f . Heat gained = $m_{\text{water}}c_{\text{water}}(T_f-20)$, the heat absorbed by the original water as it warms from 20°C to T_f . Setting heat lost = heat gained gives an equation that can be solved for T_f .

Q10. Explain why a metal spoon left in a hot cup of tea feels hot at the top end (outside the tea) after some time, and why the same effect is not observed with a wooden spoon, in terms of thermal conductivity.

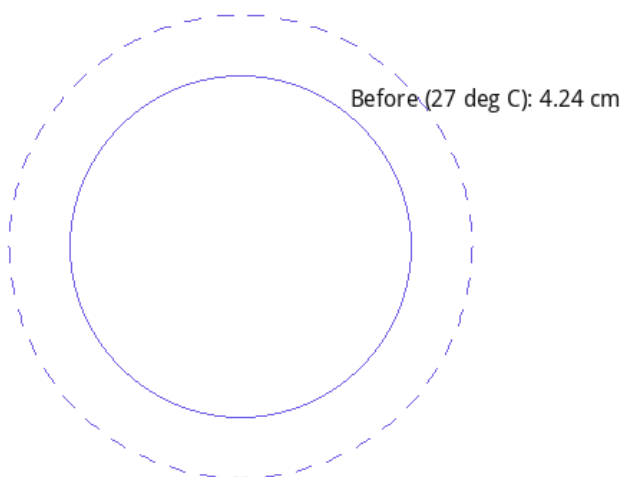
Ans: The metal spoon has a high thermal conductivity, meaning heat is efficiently conducted through its molecular/electronic structure from the hot end (in contact with the tea) to the cooler end (outside the cup), causing the top of the spoon to become noticeably warm within a short time due to conduction. A wooden

spoon has very low thermal conductivity (wood is a good thermal insulator), so heat conducted from the hot end to the top is extremely slow and negligible over the same time period, meaning the top of a wooden spoon remains close to room temperature even after prolonged contact with hot tea.

Quick visual: a worked diagram from the full [Solutions](#) page, for reference.



After (227 deg C): 4.2544 cm



Before (27 deg C): 4.24 cm

A hole expands like a disc of the same material -- it does NOT shrink

The hole in the copper sheet expands on heating, just like a solid disc would

Class 11 Physics Chapter 10 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the [Class 11 Physics Chapter 10 Solutions](#) and [Class 11 Physics Chapter 10 Revision Notes](#).

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