

## NCERT/CBSE PHYSICS CLASS 11 textbook

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Answers to NCERT/CBSE PHYSICS Class 11(Class XI)textbook Exercise and Additional exercise

CHAPTER ELEVEN

THERMAL PROPERTIES OF MATTER

EXERCISES

(For simplicity in numerical calculations, take  $g = 10 \text{ m s}^{-2}$ )

11.13 A copper block of mass 2.5 kg is heated in a furnace to a temperature of  $500^\circ\text{C}$  and then placed on a large ice block. What is the maximum amount of ice that can melt? (Specific heat of copper =  $0.39 \text{ J g}^{-1} \text{ K}^{-1}$ ; heat of fusion of water =  $335 \text{ J g}^{-1}$  ).

11.13

Solution:

Given:

Mass of copper block,  $m_1 = 2.5 \text{ kg}$

Heat of copper,  $C = 0.39 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$

Temperature of furnace,  $\theta = 500^\circ\text{C}$

Change in temperature of block,  $\Delta\theta = 500^\circ\text{C}$

Latent heat of fusion of ice,  $L = 335 \times 10^3 \text{ J kg}^{-1}$

Mass of ice that melts =  $m_2$  (let)

Now, Heat absorbed by copper block = Heat released by melted ice

$$\Rightarrow m_1 C \Delta\theta = m_2 L$$

$$\Rightarrow m_2 = \frac{m_1 C \Delta\theta}{L}$$

Substituting given values,

$$m_2 = 1.45 \text{ kg}$$

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