

## Q=mcΔT Questions

1. How much heat, in Joules, is required to raise the temperature of 0.10 kg of aluminium from 5°C to 85°C?
2. Find the heat energy lost to air when an iron bar of mass 2.0 kg at 120°C cools to room temperature (20°C).
3. When 100 g of water cools from 25°C to 15°C, how many joules of energy is released? By how much would the temperature of 10 g of aluminium be increased by this amount of energy?
4. A 4.0 kg silver ingot is cooled from 80°C to -10°C. How much heat energy is given out by the silver?
5. A 0.10 kg block of metal at 100°C is placed in 0.10 kg of water at 10°C. If the final temperature of the mixture is 25°C, what is the specific heat of the metal?
6. When 200 g of metal at 100°C is dropped into 0.050 kg of liquid at 20°C, the final temperature of the mixture is 40°C. If the specific heat capacity of the liquid is  $2.5 \times 10^3 \text{ Jkg}^{-1}\text{K}^{-1}$ , calculate the specific heat capacity of the metal.
7. A student supplies  $1.40 \times 10^4 \text{ J}$  of heat energy to 0.50 kg of alcohol in a container and the temperature rises from 10.0°C to 20.0°C. Calculate the specific heat capacity of the alcohol.
8. Two beakers of water are mixed. One holds 0.50 kg of water at a temperature of 10°C and the other holds 0.80 kg at a temperature of 70°C.
  - i) What is the final temperature of the mixture?
  - ii) Why must the mixture be insulated from the surroundings?
  - iii) Does it matter if the hotter water is added to the colder or vice versa?
  - iv) What effect, if any, does the mass of the container have on the experiment?
9. A hot iron bar of mass 2.5 kg, and at a temperature of 120°C, is placed into a full litre (10 kg) container of water at 20°C. Find the final temperature of the water. What assumptions have you made?
10. 50 g of water at 60°C is poured into a copper calorimeter of mass 16 g and containing 120 g of water at 12°C. Assuming that no heat is lost to the surroundings, what is the highest temperature reached by the mixture?