Answer **all** the questions in the spaces provided.

1 **(a)** State

(i) what may be deduced from the difference in the temperatures of two objects,

.....

..... [1]

(ii) the basic principle by which temperature is measured.

.....

..... [1]

(b) By reference to your answer in **(a)(ii)**, explain why two thermometers may not give the same temperature reading for an object.

.....

.....

..... [2]

(c) A block of aluminium of mass 670 g is heated at a constant rate of 95 W for 6.0 minutes.
The specific heat capacity of aluminium is 910 $J\,kg^{-1}\,K^{-1}$.
The initial temperature of the block is 24 °C.

(i) Assuming that no thermal energy is lost to the surroundings, show that the final temperature of the block is 80 °C.

[3]

(ii) In practice, there are energy losses to the surroundings.
The actual variation with time t of the temperature θ of the block is shown in Fig. 1.1.

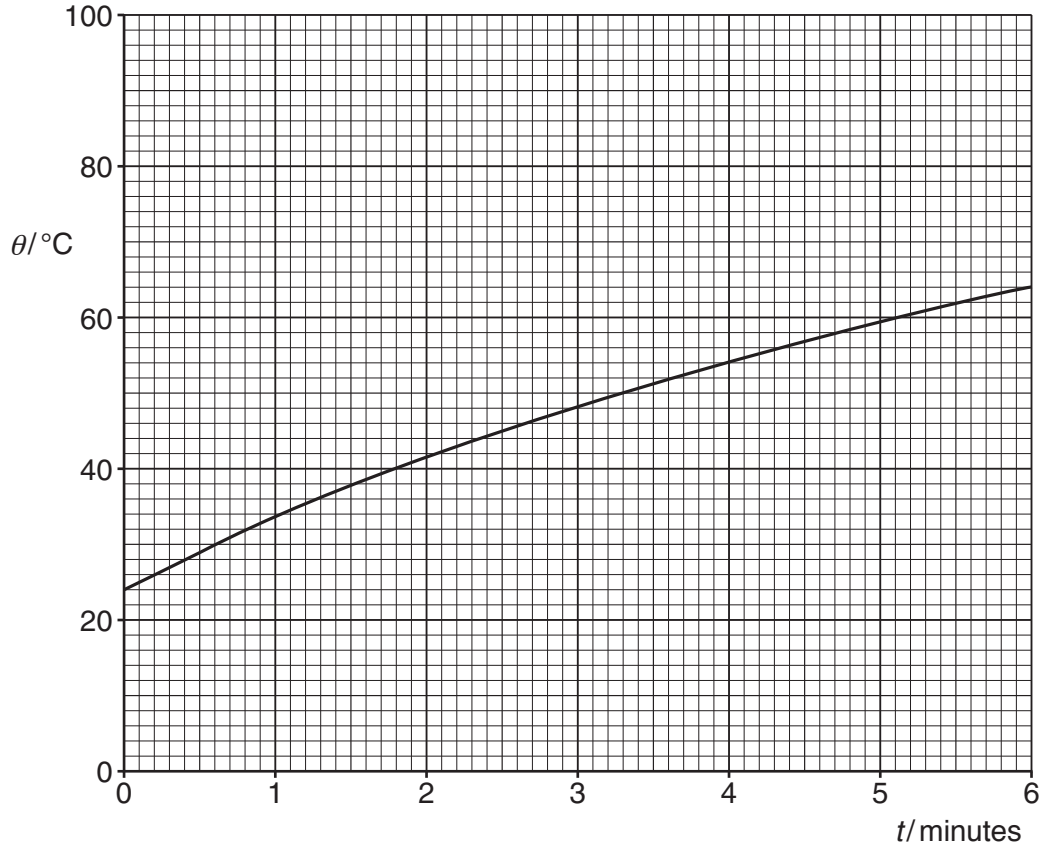

Fig. 1.1

1. Use the information in **(i)** to draw, on Fig. 1.1, a line to represent the temperature of the block, assuming no energy losses to the surroundings. [1]

2. Using Fig. 1.1, calculate the total energy loss to the surroundings during the heating process.

energy loss = ... J [2]

[Total: 10]