3 **(a)** A student states, quite wrongly, that temperature measures the amount of thermal energy (heat) in a body.

State and explain two observations that show why this statement is incorrect.

1. .....

.....

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2. .....

.....

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[4]

(b) A thermometer and an electrical heater are inserted into holes in an aluminium block of mass 960 g, as shown in Fig. 3.1.

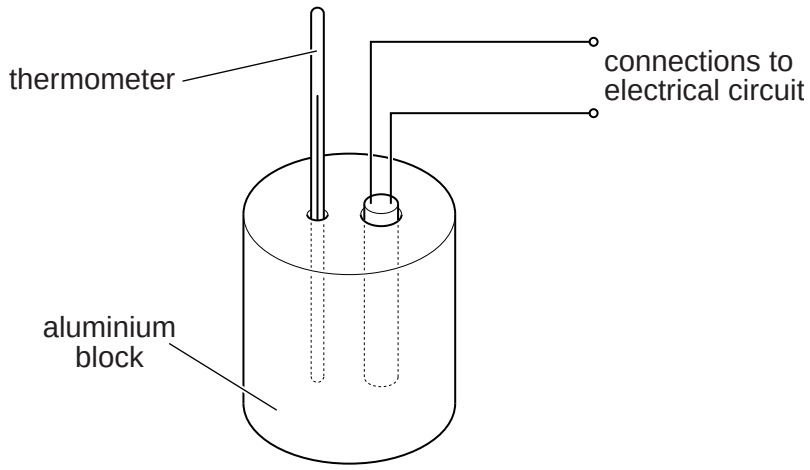

Fig. 3.1

The power rating of the heater is 54 W.

For Examiner's Use

The heater is switched on and readings of the temperature of the block are taken at regular time intervals. When the block reaches a constant temperature, the heater is switched off and then further temperature readings are taken. The variation with time t of the temperature θ of the block is shown in Fig. 3.2.

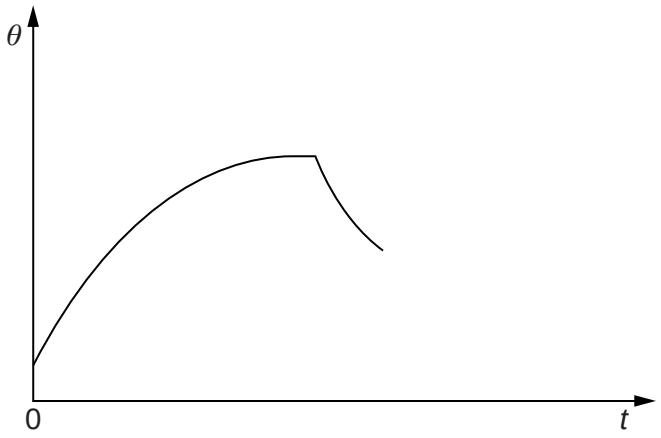

Fig. 3.2

(i) Suggest why the rate of rise of temperature of the block decreases to zero.

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..... [2]

(ii) After the heater has been switched off, the maximum rate of fall of temperature is 3.7 K per minute.

Estimate the specific heat capacity of aluminium.

specific heat capacity = ... J $kg^{-1} K^{-1}$ [3]