

- 2** A mercury-in-glass thermometer is to be used to measure the temperature of some oil.

The oil has mass 32.0 g and specific heat capacity $1.40 \text{ J g}^{-1} \text{ K}^{-1}$. The actual temperature of the oil is 54.0°C .

The bulb of the thermometer has mass 12.0 g and an average specific heat capacity of $0.180 \text{ J g}^{-1} \text{ K}^{-1}$. Before immersing the bulb in the oil, the thermometer reads 19.0°C .

The thermometer bulb is placed in the oil and the steady reading on the thermometer is taken.

(a) Determine

- (i)** the steady temperature recorded on the thermometer,

temperature = $^\circ\text{C}$ [3]

(ii) the ratio

$$\frac{\text{change in temperature of oil}}{\text{initial temperature of oil}}.$$

ratio = [1]

- (b) Suggest, with an explanation, a type of thermometer that would be likely to give a smaller value for the ratio calculated in (a)(ii).

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..... [2]

- (c) The mercury-in-glass thermometer is used to measure the boiling point of a liquid. Suggest why the measured value of the boiling point will **not** be affected by the thermal energy absorbed by the thermometer bulb.

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..... [2]