

- 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  $54.0^\circ\text{C}$ .

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  $19.0^\circ\text{C}$ .

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).

.....  
.....  
.....

[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.

.....  
.....  
.....  
.....

[2]