

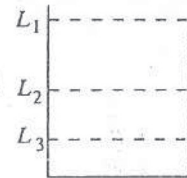
2006 A/L Structured Essay Question No (02)

2. A student wants to determine the specific heat capacity of a liquid using the method of cooling. For this he plans to obtain cooling curves for water and the liquid separately. All necessary equipment for the experiment have been provided.

(a) In this experiment it is important to use **equal volumes of water and liquid**. Give the reason for this.

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(b) Figure shows three different levels marked on the calorimeter.



(i) Of these three levels, up to which level the student should fill water/liquid to obtain a more accurate result in this experiment.

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(ii) Give the reason for your answer in (b) (i) above.

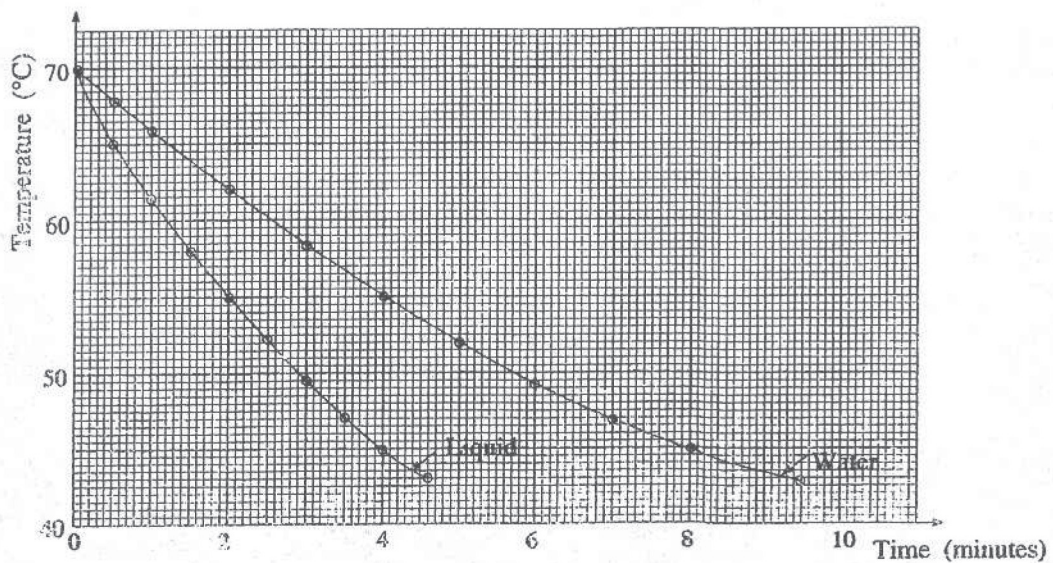
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(c) What experimental step should the student follow in order to make sure that the thermometer immersed in water or liquid reads the temperature of the calorimeter surface?

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(d) The two cooling curves obtained by the student are shown in the figure.



Other data of the experiment are also given below.

Heat capacity of the calorimeter and the stirrer = 112 J K^{-1}

Mass of water = 0.2 kg

Specific heat capacity of water = $4 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$

Mass of the liquid = 0.172 kg

- (i) What is the average rate of heat loss of the calorimeter with water during the cooling from 55°C to 45°C ?

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- (ii) Calculate the specific heat capacity of the liquid.

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- (e) Why is it **not** suitable to use a glass container in place of the calorimeter in this experiment?

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