A student wants to determine the specific latent heat of fusion of ice using the method of mixtures in the school laboratory. A calorimeter containing water, ice and all other necessary items for the experiment have been provided.

(*a*) Should the initial temperature of water inside the calorimeter be below, above or at the room temperature?

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(*b*) Give the reason for your answer in (*a*) above.

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(*c*) Give **three** precautionary steps that the student should follow when ice is added into the calorimeter.

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(*d*) When stirring the ice and water mixture, ice pieces should not float on water. What is the reason for this?

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(*e*) What experimental procedure the student should follow when obtaining the final temperature?

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(*f*) The student obtained the following data and information from this experiment.

Heat capacity of calorimeter and stirrer	=	40 J K^{-1}
Initial mass of water inside calorimeter	=	100 g
Initial temperature of water	=	35° C
Final temperature of water	=	25° C
Mass of ice melted	=	11 g

Calculate the specific latent heat of fusion of ice.
(Specific heat capacity of water = 4×10^3 J kg^{-1} K^{-1})

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(*g*) On another day when the room temperature was the same, the student repeated the experiment with the same apparatus and with the same amount of water. But he observed that dew was formed on the surface of the calorimeter when obtaining the final temperature 25° C. The mass of the ice melted is 18 g and the mass of dew formed on the calorimeter is 0·86 g. Assuming that the dew point is 25 °C and heat released by condensing water vapour is completely absorbed by the calorimeter, calculate the specific latent heat of vaporization of water at this temperature.

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