12 Cocoa powder, milk and hot water are mixed together to produce a 'hot chocolate' drink. The mass of the drink is 275 g, and its initial temperature is 71.5 °C.

Ice at 0.0 °C is added to the drink to reduce its temperature. Research indicates that the maximum serving temperature of any hot drink should be 58.0 °C.

Deduce whether 4.0 g of ice would be enough to bring the temperature below 58.0 °C.

specific latent heat of ice = 3.34×10^5 J kg^{-1}
specific heat capacity of 'hot chocolate' = 3750 J kg^{-1} °C^{-1}
specific heat capacity of water = 4190 J kg^{-1} °C^{-1}

(Total for Question 12 = 5 marks)

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