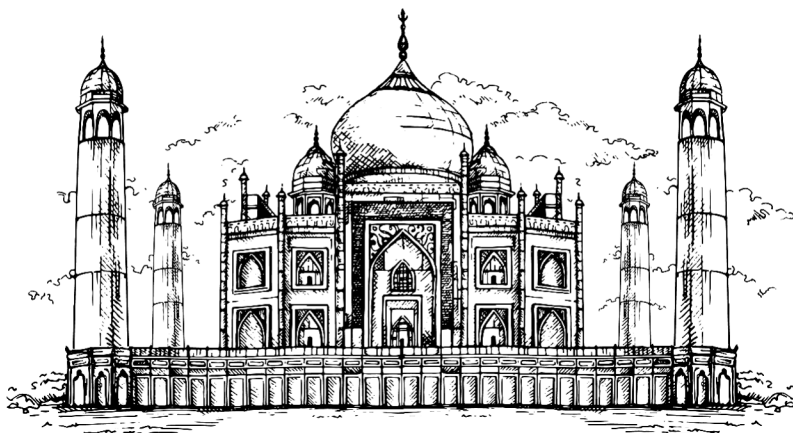13 In the book Charlie and the Chocolate Factory, a palace is made entirely from chocolate. Soon after it was made the palace melted, due to energy transfer from the Sun.

(Source: Morkhatenok/Shutterstock)

The total volume of chocolate used for the palace was $1250\,m^3$. The initial temperature of the chocolate palace was $28.5\,°C$. Chocolate melts at a temperature of $36.0\,°C$.

The book states that the palace melted completely in less than a day.

Deduce whether this statement could be correct.

rate of energy transfer to the palace $= 7.5 \times 10^5\,W$
density of chocolate $= 1325\,kg\,m^{-3}$
specific latent heat of chocolate $= 4.5 \times 10^4\,J\,kg^{-1}$
specific heat capacity of chocolate is $1.30 \times 10^3\,J\,kg^{-1}\,K^{-1}$

(6)

....

....

....

....

....

....

....

....

....

....

....

....

(Total for Question 13 = 6 marks)