11 A cup contains 180 g of black coffee at a temperature of 82 °C. 68 g of milk at a temperature of 2.7 °C is added to the coffee. An ideal temperature range for drinking coffee is said to be 50 °C to 60 °C.

Deduce whether the coffee will be within the ideal temperature range when the milk is added.

initial temperature of milk = 2.7 °C

specific heat capacity of black coffee = $4.2 \times 10^3\,J\,kg^{-1}\,K^{-1}$

specific heat capacity of milk = $3.9 \times 10^3\,J\,kg^{-1}\,K^{-1}$

(3)

(Total for Question 11 = 3 marks)