12(a) Use of $P = \frac{\Delta E}{\Delta t}$ (1) Use of $\Delta E = mc\Delta\theta$ (1) $t = 216 \text{ (s)}$ (1) $Example of calculation$ $P \Delta t = mc\Delta\theta$ $t = \frac{0.165 \text{ kg} \times 4190 \text{ J kg}^{-1} \text{ K}^{-1} \times (100 - 12.5) \text{ K}}{280 \text{ W}} = 216 \text{ s}$ 12(b) Use of ΔE from (a) Or use of $P = \frac{\Delta E}{\Delta t}$ using value for Δt from (a) Or use of $\Delta E = mc\Delta\theta$ with $\Delta \theta = (100 - 87.7)$ (1) Use of $\Delta E = mc\Delta\theta$ and $\Delta E = mL$ (1) $m = 3.7 \times 10^{-3} \text{ kg (allow ecf from (a)}$ (1) $Example of calculation$ $P \Delta t = mc\Delta\theta + mL$ $280 \text{ W} \times 216 \text{ s} = 0.165 \text{ kg} \times 4190 \text{ J kg}^{-1} \text{ K}^{-1} \times (87.7 - 12.5) \text{ K} + m \times 2.29 \times 10^6 \text{ J kg}^{-1}$ $\therefore 6.05 \times 10^4 \text{ J} = 5.20 \times 10^4 \text{ J} + m \times 2.29 \times 10^6 \text{ J kg}^{-1}$ $\therefore m = \frac{6.05 \times 10^4 \text{ J} - 5.20 \times 10^4 \text{ J}}{2.29 \times 10^6 \text{ J kg}^{-1}} = 3.71 \times 10^{-3} \text{ kg}$	<b>Question</b> <b>Number</b>	Answer	Mark
Use of $\Delta E = mc\Delta\theta$ (1) $t = 216 \text{ (s)}$ (1)  Example of calculation $P \Delta t = mc\Delta\theta$ $\therefore t = \frac{0.165 \text{ kg} \times 4190 \text{ J kg}^{-1} \text{ K}^{-1} \times (100 - 12.5) \text{ K}}{280 \text{ W}} = 216 \text{ s}$ 12(b)  Use of $\Delta E$ from (a)  Or use of $P = \frac{\Delta E}{\Delta t}$ using value for $\Delta t$ from (a)  Or use of $\Delta E = mc\Delta\theta$ with $\Delta \theta = (100 - 87.7)$ (1)  Use of $\Delta E = mc\Delta\theta$ and $\Delta E = mL$ (1) $m = 3.7 \times 10^{-3} \text{ kg (allow ecf from (a)}$ (1) $E = mc\Delta\theta + mL$ (1) $E = mc\Delta\theta + mL$ (280 W × 216 s = 0.165 kg × 4190 J kg <sup>-1</sup> K <sup>-1</sup> × (87.7 - 12.5) K + m × 2.29 × 10 <sup>6</sup> J kg <sup>-1</sup> $E = mc\Delta\theta + mL$ (1)		Use of $P = \frac{\Delta E}{}$ (1)	
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12(b) Use of ΔE from (a) Or use of $P = \frac{\Delta E}{\Delta t}$ using value for Δt from (a) Or use of $\Delta E = mc\Delta\theta$ with $\Delta\theta = (100 - 87.7)$ (1)  Use of $\Delta E = mc\Delta\theta$ and $\Delta E = mL$ (1) $m = 3.7 \times 10^{-3}$ kg (allow ecf from (a)  Example of calculation $P \Delta t = mc\Delta\theta + mL$ 280 W × 216 s = 0.165 kg × 4190 J kg <sup>-1</sup> K <sup>-1</sup> × (87.7 – 12.5) K $+ m \times 2.29 \times 10^6$ J kg <sup>-1</sup> ∴ 6.05 × 10 <sup>4</sup> J = 5.20 × 10 <sup>4</sup> J + $m \times 2.29 \times 10^6$ J kg <sup>-1</sup>		$P \Delta t = mc\Delta \theta$	
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$280 \text{ W} \times 216 \text{ s} = 0.165 \text{ kg} \times 4190 \text{ J kg}^{-1} \text{ K}^{-1} \times (87.7 - 12.5) \text{ K}$ $+ m \times 2.29 \times 10^6 \text{ J kg}^{-1}$ $\therefore 6.05 \times 10^4 \text{ J} = 5.20 \times 10^4 \text{ J} + m \times 2.29 \times 10^6 \text{ J kg}^{-1}$		Example of calculation	
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Total for Question 12 6		Total for Organization 12	