

How long does it take a 37.5 W heater to heat up my 225 g of coffee from 31 to 87.5 degrees C if my glass cup is 455 g. The "c" of the coffee is 3960 J/kg C

Apr 8-9:04 AM

How long does it take a 37.5 W heater to heat up my 225 g of coffee from 31 to 87.5 degrees C if my glass cup is 455 g. The "c" of the coffee is 3960J/kg C.

$$P = Q/t$$

$$t = Q/P$$

$$t = \frac{mc\Delta t_c + mc\Delta t_{\text{cup}}}{P}$$

$$t = \frac{.225\text{kg}(3960 \text{ J/kg C})56.5^\circ\text{C} + .455 \text{ kg}(664 \text{ J/kg C})56.5^\circ\text{C}}{37.5 \text{ W}}$$

$$t = 1800 \text{ s} \rightarrow 30 \text{ min.}$$

Apr 12 - 10:34 AM

What is the power rating of Mr. G's coffee maker if it heats up one Liter of water from 20 to 60 degrees C in 2 minutes

Apr 8-9:04 AM

What is the power rating of Mr. G's coffee maker if it heats up one Liter of water from 20 to 60 degrees C in 2 minutes

$$P = Q/t = mc\Delta t/t$$

$$P = \frac{1 \text{ kg}(4180 \text{ J/kg C})(60.^{\circ}\text{C} - 20.^{\circ}\text{C})}{120 \text{ s}}$$

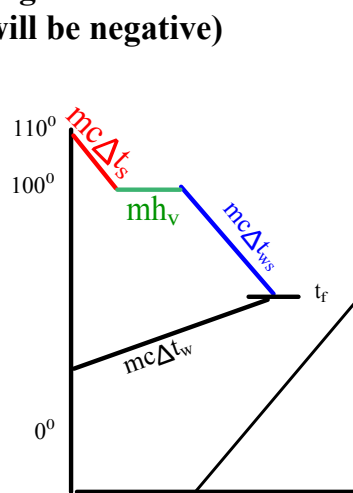
$$P = 1390 \text{ W}$$

Apr 12 - 10:44 AM

What is the final temperature if you add 50.0 g of steam at 110 degrees C to 455 ml of water at 27.0 degrees C?

Mar 15-9:16 PM

What is the final temperature if you add 50.0 g of steam at 110 degrees C to 455 ml of water at 27.0 degrees C? (note that the heat of vaporization is negative- this is because the TE is lost! Any time heat is lost the "h" will be negative)



$$mc\Delta t_s + mh_v + mc\Delta t_{ws} + mc\Delta t_w = 0$$

$$mc\Delta t_{ws} + mc\Delta t_w = -mh_v - mc\Delta t_s$$

$$mc(t_f - t_i)_{ws} + mc(t_f - t_i)_w = -mh_v - mc\Delta t_s$$

$$mct_{fws} - mct_{iws} + mct_{fw} - mct_{iw} = -mh_v - mc\Delta t_s$$

$$mct_{fws} + mct_{fw} = -mh_v - mc\Delta t_s + mct_{iws} + mct_{iw}$$

$$t_f = \frac{-mh_v - mc\Delta t_s + mct_{iws} + mct_{iw}}{(mc_{ws} + mc_w)}$$

$$t_f = \frac{.05 \text{ kg} (-2.26 \times 10^6 \text{ J/kg}) - .05 \text{ kg} (2020 \text{ J/kgC}) - 10^\circ\text{C} + .05 \text{ kg} (4180 \text{ J/kgC}) 100^\circ\text{C} + .455 \text{ kg} (4180 \text{ J/kgC}) 27^\circ\text{C}}{(.05 \text{ kg} (4180 \text{ J/kgC}) + .455 \text{ kg} (4180 \text{ J/kgC}))}$$

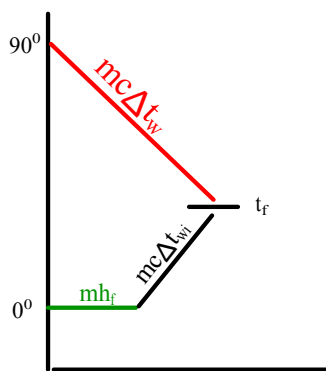
$$t_f = 88^\circ \text{C}$$

Mar 15-9:21 PM

What is the final temperature if you add 50.0 g of ice at 0 degrees C to 455 ml of water at 87.0 degrees C?

Apr 12 - 12:45 PM

What is the final temperature if you add 50.0 g of ice at 0 degrees C to 455 ml of water at 87.0 degrees C



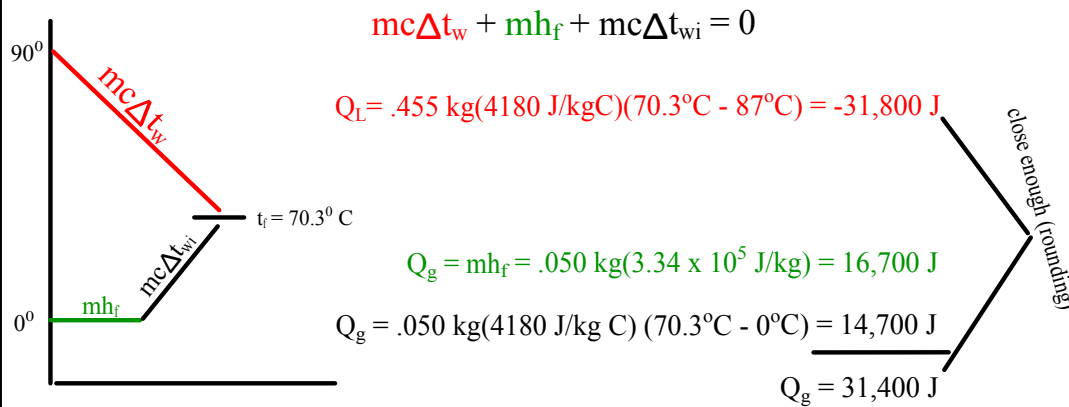
$$\begin{aligned}
 mc\Delta t_w + mh_f + mc\Delta t_{wi} &= 0 \\
 mc\Delta t_w + mc\Delta t_{wi} &= -mh_f \\
 mct_{fw} - mct_{iw} + mct_{fwi} - mct_{iwi} &= -mh_f \\
 mct_{fw} + mct_{fwi} &= -mh_f + mct_{iw} + mct_{iwi} \\
 t_f(mc_w + mc_{wi}) &= -mh_f + mct_{iw} + mct_{iwi} \\
 t_f &= \frac{-mh_f + mct_{iw} + mct_{iwi}}{(mc_w + mc_{wi})}
 \end{aligned}$$

$$t_f = \frac{-.05 \text{ kg} (3.34 \times 10^5 \text{ J/kg}) + .455 \text{ kg} (4180 \text{ J/kgC}) 87.0^\circ\text{C} + .05 \text{ kg} (4180 \text{ J/kgC}) 0^\circ\text{C}}{(.455 \text{ kg} (4180 \text{ J/kgC}) + .05 \text{ kg} (4180 \text{ J/kgC}))}$$

$$t_f = 70.3^\circ\text{C}$$

Apr 8-9:04 AM

What is the final temperature if you add 50.0 g of ice at 0 degrees C to 455 ml of water at 87.0 degrees C

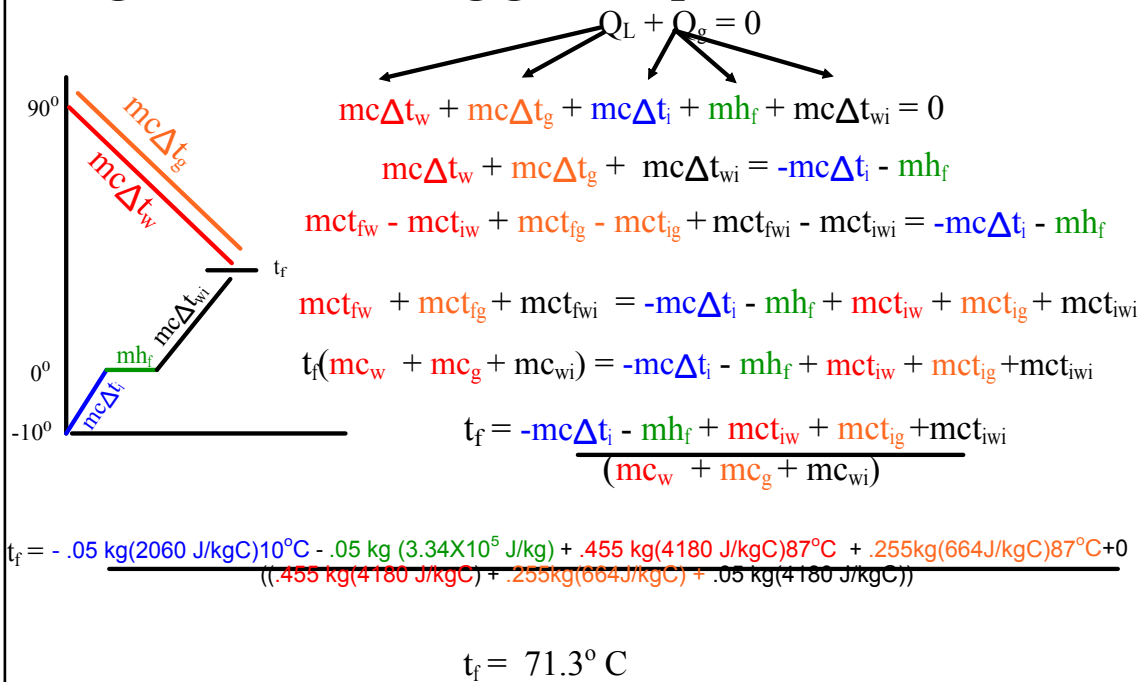


Mar 17-7:03 AM

What is the final temperature if you add 50.0 g of ice at -10.0 degrees C to 455 ml of water at 87.0 degrees C in a 255 g glass cup?

Apr 8-1:09 PM

What is the final temperature if you add 50.0 g of ice at -10.0 degrees C to 455 ml of water at 87.0 degrees C in a 255 g glass cup?



Apr 8-11:17 AM

What is the "c" of a disgruntled 67.3 kg physics student (tomorrow's test) who runs headlong at 4.75 m/s (better than backlong) into a wall and changes in temp. 0.00313 degrees C?....student heats up!

Apr 8-9:04 AM

What is the "c" of a disgruntled 67.3 kg physics student (tomorrows test) who runs headlong at 4.75 m/s(better than backlong) into a wall and changes in temp. 0.00313 degrees C?....student heats up!

$$KE = Q$$

$$1/2 mv^2 = mc\Delta t$$

$$c = v^2/2\Delta t$$

$$c = (4.75 \text{ m/s})^2 / (2 \times .00313^\circ\text{C})$$

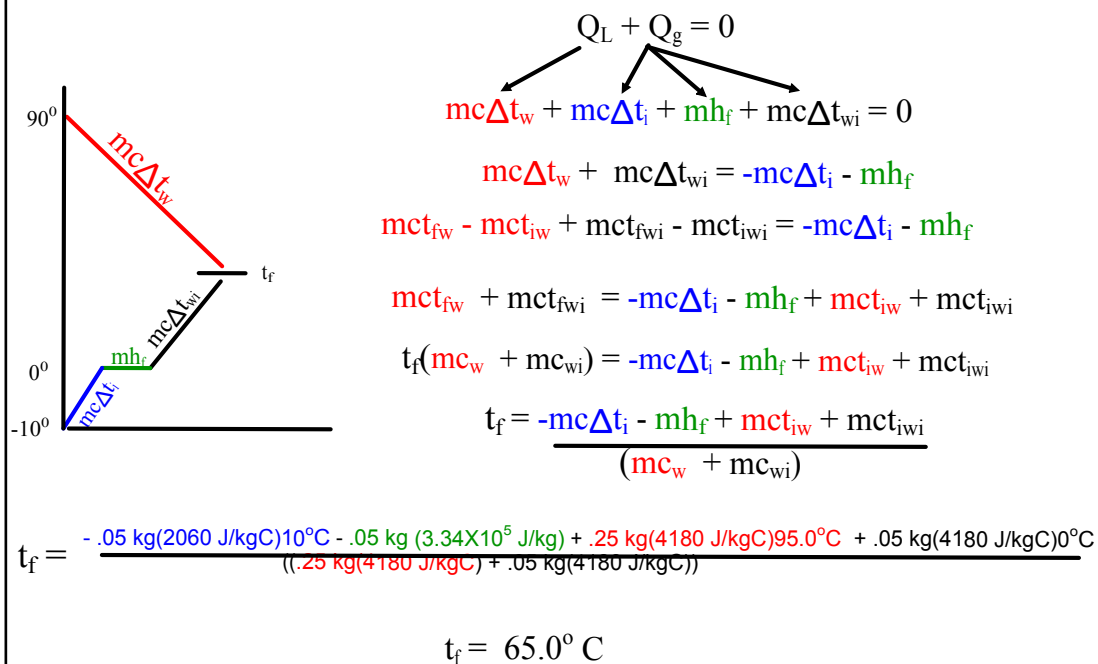
$$c = 3600 \text{ J/kgC}$$

Apr 12 - 1:36 PM

50.0 g of ice at -10.0° is added to 250. g of water at 95.0°C . What is the final temperature of the mixture?

Apr 8-1:24 PM

50.0 g of ice at -10.0° is added to 250. g of water at 95.0°C . What is the final temperature of the mixture?



Apr 8-9:09 AM

How does a heat engine convert TE to mechanical energy?

How does a heat pump use work to move TE?

Mar 31-7:02 AM