

c) As a result, the *actual* temperature of the flame is higher or lower than the value you calculated?

Higher

Lower

4. A replica of the Eiffel Tower in Las Vegas stands 200-m tall on a day of average temperature of 18°C. How much taller is the tall tower on a hot day when it is 42°C? The coefficient of expansion for steel is $11 \times 10^{-6}/^{\circ}\text{C}$. Express your answer in meters.

5. At a mountaineer's camp site in order to produce steam in a furnace, 100 kg of ice at -20°C is fed into the heating system and is converted into steam at 100°C . Given that the specific heat of ice is $0.48 \text{ cal/g}^{\circ}\text{C}$, calculate the heat needed. Do this in four steps. Show the formula, then plug in the numbers. Express you answers in kcal (kilocalories).

a) Step 1, find the heat required to raise the temperature of ice by 20°C .

$$Q = \underline{\hspace{2cm}}$$

b) Step 2, find the heat required to melt the 0°C ice to 0°C water.

$$Q = \underline{\hspace{2cm}}$$

c) Step 3, find the heat required to raise the 0°C water to 100°C water.

$$Q = \underline{\hspace{2cm}}$$

d) Step 4, find the heat required vaporize the water into steam.

$$Q = \underline{\hspace{2cm}}$$

e) Total heat required: $Q = \underline{\hspace{2cm}}$

6. What is the temperature of the water at the bottom of Lake Tahoe?

a) $T = \underline{\hspace{2cm}}$

b) Why?

c) A glass of water has several large ice cubes floating in it. What happens to the water level when the cubes melt?

- a) the water level rises
- b) the water level stays the same
- c) the water level drops