Homework

m=1kg of ice is placed into an electric kettle that has power *P=1500W*. Initial temperature of ice is *0°C*.

- a) Find the amount of heat needed to (i) melt the ice, (ii) bring the water to boiling, and (iii) evaporate it completely.
- b) Based on the results of (a), how much time is needed to evaporate all the water, starting with ice.

Remember that:

• Amount of heat needed to melt ice or vaporize water of mass *m*, is

∆Q=Lm

Here *L* is called *specific latent heat* of melting or vaporization, respectively. For melting at *0°C*, *L*= **334kJ/kg**, for vaporization at *100°C*, *L*= **2265 kJ/kg**.

• Amount of heat needed to increase temperature of a substance by amount ΔT , is

$\Delta Q = Cm \Delta T$

Here **m** is mass and **C** is called *specific heat capacity*. For liquid water, $C = 4.2 \frac{kJ}{kg \cdot {}^{0}C}$.