

P #40

Ch 11 - pg 355

$$A = .80 \text{ m}^2$$

$$L = 2.0 \text{ cm} = .02 \text{ m}$$

$$\Delta T = 25^\circ\text{C} - 5^\circ\text{C} = 20^\circ\text{C}$$

$$m_{\text{ice}} = 5.0 \text{ kg}$$

$$L_f = 3.33 \times 10^5 \text{ J/kg}$$

$$t = 8.0 \text{ hr} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} = 28,800 \text{ sec}$$

Find

$$H = \frac{Q_{\text{melt}}}{t} = \frac{m \cdot L_f}{t} = \frac{(5.0 \text{ kg})(3.33 \times 10^5 \text{ J/kg})}{(28,800 \text{ sec})}$$

$$H = 57.8 \text{ J/sec}$$

Find k:

$$H = \frac{k \cdot A \cdot \Delta T}{L}$$

$$(57.8 \text{ J/sec}) = \frac{k \cdot (.80 \text{ m}^2)(20^\circ\text{C})}{(.02 \text{ m})}$$

$$k = .072 \text{ J/s m}^\circ\text{C}$$