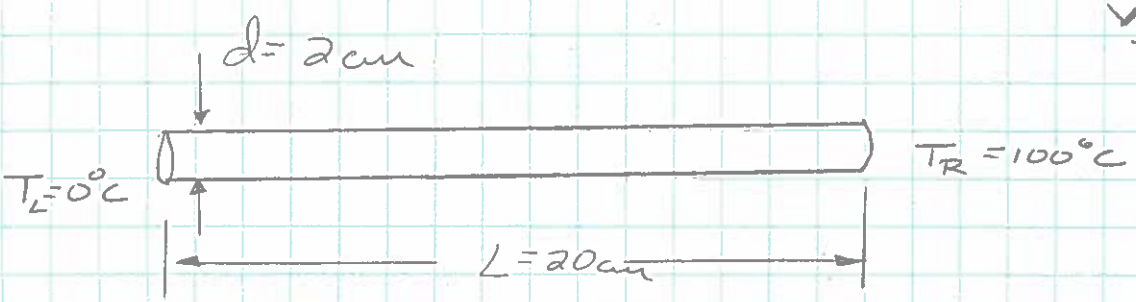

$$\frac{Q}{\Delta t} = 4.5 \times 10^4 \frac{J}{hr} \left(\frac{1\,hr}{3600\,s}\right) = 12.5 \frac{J}{s} \text{ or } W$$

Now:

$$\frac{Q}{\Delta t} = \frac{kA}{L} \Delta T = \frac{k\pi (d/2)^2 (T_R - T_L)}{L}$$

$$\therefore \quad k = \left(\frac{Q}{\Delta t}\right) \frac{L}{\pi (d/2)^2 (T_R - T_L)}$$

$$= 79.58 \frac{W}{m\,K}$$

From table 19.5, this is close to the value for **Iron**.