Problem B.

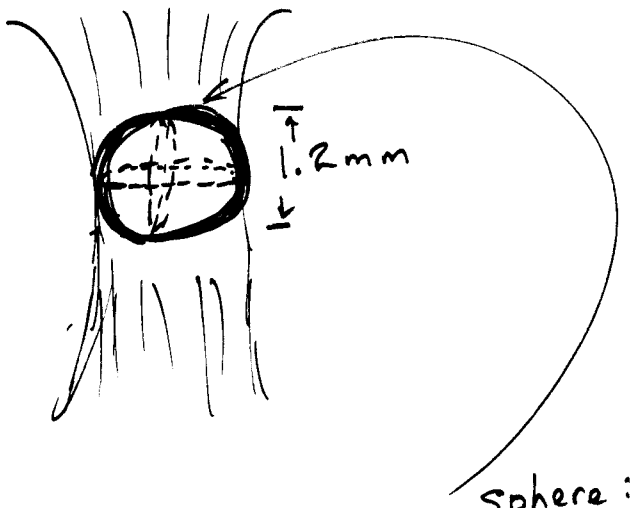
The temperature of a gas stream is measured by a thermocouple whose junction can be approximated as a 1.2mm diameter sphere.

The properties of the junction are:

$k = 40.5 \frac{W}{m \cdot K}$, $\rho = 7950 \frac{Kg}{m^3}$, $C_p = 345 \frac{J}{Kg \cdot K}$

- The heat transfer coefficient between the junction and the air → $h = 250 \frac{W}{m^2 \cdot K}$.

→ Determine how long it will take the thermocouple to read 50% and 99% of the initial temperature.



Sphere: diameter = 1.2mm