Ch 18 #15

Hopefully it makes sense to you right away that this situation is possible, as long as the tungsten wire has a large enough diameter. To decide on what exactly *how* wide of a diameter, start by setting $R_{Cu} = R_{tungsten}$, which means that $\rho L/A = \rho L/A$. Use this to solve for the radius of the tungsten wire, which can be turned into a diameter.

Ch 18 #16

This is almost more of a conceptual question. Make sure you understand it, but it's very difficult to show much work for it.

Ch 18 #21

Think of the block as a ‘wire’, and use the direction of current flow to determine what dimension of the block should be thought of as its length, and what dimensions should be used to find its area.

Ch 18 #22

Since you want the two wires to have equal resistance, start with $R_{short} = R_{long}$. But subce you know they're the same material, and since L_{long} is twice as long as L_{short}, your equation can be turned into the following:

$$L_{short} / A_{short} = 2L_{short} / A_{long}$$

From here, just rearrange to find the ratio of the radii of the long wire to the short wire.

Ch 18 #38

The general strategy should be apparent to you, that you need to find the resistance of the wire (to and from the device), and use it to calculate power dissipated. But to calculate power, you do need to know that the correct version of the formula is $P = I^2R$.