POE Practice Problems

A team of students tests a material for its thermal conductivity (k). After 20 minutes in a heat box, the temperature is 48° C inside the box and 28° C on top of the material. The following data is true about this test:

Area of material = .0225 m^2 Thickness of material = .0127 m   Light bulb = 25 W

1. Calculate the thermal conductivity constant (k) for the material.

Formula	Substitute / Solve	Final Answer

2. Calculate the amount of energy transferred through the material.

Formula	Substitute / Solve	Final Answer

3. A piece of copper steel (specific heat = 490 J/kg·K) has a mass of 300 g. If it is heated to 150°C, then plunged into 4.00 kg water (specific heat = 4180 J/kg·K) at 20°C, what will be the final temperature at equilibrium?

Formula	Substitute / Solve	Final Answer