

Name: _____

Physics 202 Quiz 3

Apr 22, 2013

Word Problems

Show all your work and circle your final answer. (Ten points each.)

1. A wall in a house contains a single window. The window consists of a single pane of glass whose area is 0.16 m^2 and whose thickness is 2.0 mm . Treat the wall as a slab of the insulating material Styrofoam whose area and thickness are 18 m^2 and 0.10 meters , respectively. Heat is lost via conduction through the window and the wall. The temperature difference between the inside and outside is the same for the window and the wall. Of the total heat lost by the wall and the window, what is the percentage lost by the window?

2. In an aluminum pot, 0.15 kilograms of water at $100\text{ }^{\circ}\text{C}$ boils away in four minutes. The bottom of the pot is 3.1 mm thick and has a surface area of 0.015 m^2 . To prevent the water from boiling too rapidly, a stainless steel plate has been placed between the pot and the heating element. The plate is 1.4 mm thick, and its area matches that of the pot. Assuming that heat is conducted into the water only through the bottom of the pot, find the temperature at (a) the aluminum-steel interface and (b) the steel surface in contact with the heating element.