

AOS 100/101
Spring 2008

HOMework #2
(Due Fri. February 22)

Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences. Don't forget to write your name on the paper!!!

NAME:

- 1) A friend of yours conducts an experiment in which she places a small beaker of fluid into a larger beaker of fluid and observes changes in the temperatures of the fluids. She tells you that the initial and final conditions of the experiment are represented by the diagrams labeled INITIAL and FINAL in Fig. 1. Is this an accurate statement? How can you be sure? Explain your answer in terms of the Second Law of Thermodynamics.

(10 pts.)

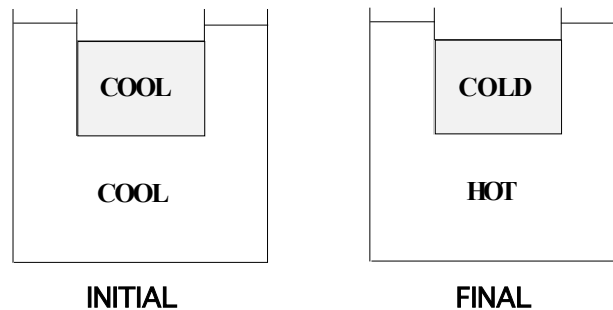


FIG. 1

- 2) Marble is a better conductor of heat than wood. A marble column and a wooden pole are situated next to one another in an outdoor garden. As a result, the temperature of the marble is always the same as the temperature of the wood. Despite this fact, the marble feels colder to the touch than the wood. Explain why.
(10 pts.)
- 3) Snow behaves like a *black-body* with respect to infra-red radiation. Given this fact, explain why the temperature inside igloos and snowcaves becomes more comfortable the longer they are inhabited. (Kirchoff's Law will help here).
(10 pts.)
- 4) Assume an object experiences no change in temperature with the passage of time. If that object is absorbing 157 units of radiant energy every second, how much is it emitting? Explain your answer with reference to the concept of *radiative equilibrium*.
(10 pts.)