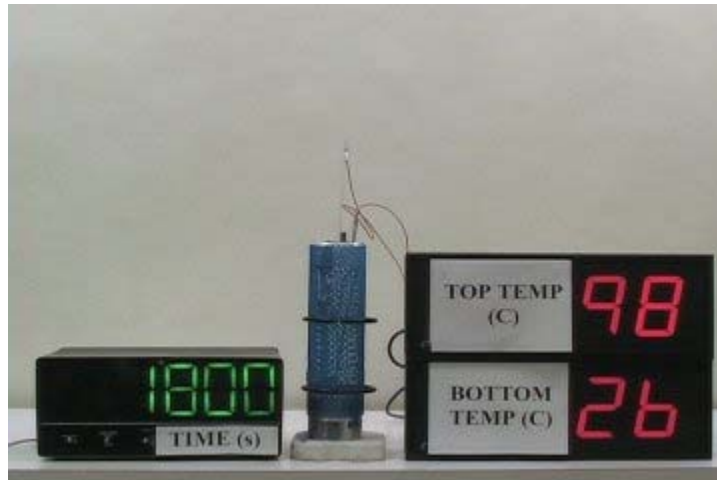


## Answer #314

**Part 1:** The answer is (f): almost 100°.

**Part 2:** The answer is (b): about 26°.

This can be seen in an mpeg video by clicking your mouse on the photograph below, which is the frame of the video after exactly 30 minutes (1800 seconds). (Note that the video is speeded up during most of the 1800 seconds duration!)



This phenomenon arises due to (1) heat radiation from the top of the dewar, (2) the poor conductivity of water, and (3) the fact that hot water is less dense than cold water, so hot water naturally will "float" on cooler water. Sometimes when you swim in a lake or river you may notice that the top surface of the water is warm, but the water down below, where you can stick your feet, may feel much cooler.

The "layering" of warmer water over cooler water is called *density lock*. This feature of water is actually used in an advanced nuclear reactor design called **PIUS**: Project Inherent Ultimate Safety, yielding one of the most advanced safety features of any nuclear reactor. This is one of a group of *passive* safety designs that are being built into reactors that will be constructed in the 21<sup>st</sup> century.

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For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address

given on the [Lecture-Demonstration Home Page](#).