ME202 – THERMODYNAMICS

Home Study 1

Section: N/A
Due Date: N/A

PROBLEMS

1. An office worker claims that a cup of cold coffee on his table warmed up to 80°C by picking up energy from the surrounding air, which is at 25°C. Is there any truth to his claim? Does this process violate any thermodynamic laws?

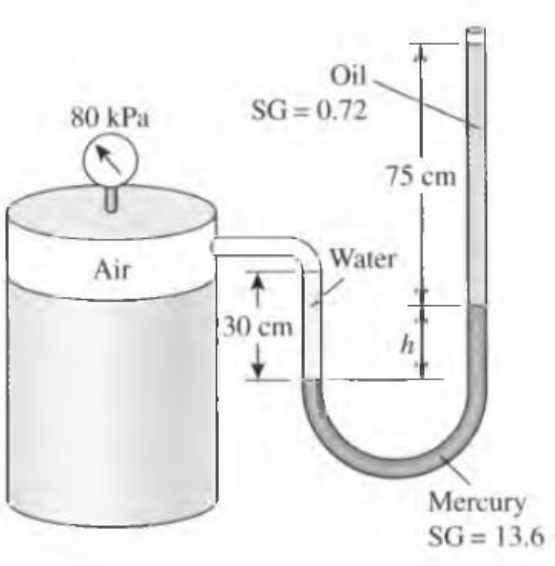
2. Explain why the light-year has the dimension of length.

3. You have been asked to do a metabolism (energy) analysis of a person. How would you define the system for this purpose? What type of system is this?

4. Consider an alcohol and a mercury thermometer that read exactly 0°C at the ice point and 100°C at the steam point. The distance between the two points is divided into 100 equal parts in both thermometers. Do you think these thermometers will give exactly the same reading at a temperature of, say, 60°C? Explain.

5. What is the difference between gage pressure and absolute pressure?

6. Calculate the absolute pressure, P_h of the manometer shown in figure below in kPa. The local atmospheric pressure is 758 mm Hg.



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7. Consider the system shown in figure below. If a change of 0.7 kPa in the pressure of air causes the brine-mercury interface in the right column to drop by 5 mm in the brine level in the right column while the pressure in the brine pipe remains constant, determine the ratio of A_2/A_1.

