

Assignment 1

1. A can of soft drink at room temperature is put into the refrigerator so that it will cool. Would you model the can of soft drink as a closed system or as an open system? Explain.
2. For a system to be in thermodynamic equilibrium, do the temperature and the pressure have to be the same everywhere?
3. What is a quasi-equilibrium process? What is its importance in engineering?
4. Is the state of the air in an isolated room completely specified by the temperature and the pressure? Explain.
5. Portable electric heaters are commonly used to heat small rooms. Explain the energy transformation involved during this heating process.
6. When is the energy crossing the boundaries of a closed system heat and when is it work?
7. For a cycle, is the net work necessarily zero? For what kind of systems will this be the case?
8. Water is being heated in a closed pan on top of a range while being stirred by a paddle wheel. During the process, 30 kJ of heat is transferred to the water, and 5 kJ of heat is lost to the surrounding air. The paddle-wheel work amounts to 500 N · m. Determine the final energy of the system if its initial energy is 10 kJ.

