

Thermodynamics 1st Law Conceptual Problems

Conceptual Problems from Cutnell and Johnson 9th Edition Ch 15

Thermodynamics. 1st-Law.CP.PUB.1: The first law of thermodynamics states that the change ΔU in the internal energy of a system is given by $\Delta U = Q - W$, where Q is the heat and W is the work. Both Q and W can be positive or negative numbers. Q is a positive number if _____, and W is a positive number if _____. **(a)** the system *loses* heat; work is done *by* the system **(b)** the system *loses* heat; work is done *on* the system **(c)** the system *gains* heat; work is done *by* the system **(d)** the system *gains* heat; work is done *on* the system

Conceptual Problems from Knight 3rd Edition Ch 11

Thermodynamics. 1st-Law.CP.PUB.2: When the space shuttle returns to earth, its surfaces get very hot as it passes through the atmosphere at high speed.

- Has the space shuttle been heated? If so, what was the source of the heat? If not, why is it hot?
- b. Energy must be conserved. What happens to the space shuttle's initial kinetic energy?

Thermodynamics. 1st-Law.CP.PUB.3: One end of a short aluminum rod is in a campfire and the other end is in a block of ice, as shown in Figure Q 11.8. If 100 J of energy are transferred from the fire to the rod, and if the temperature at every point in the rod has reached a steady value, how much energy goes from the rod into the ice?



FIGURE Q11.8

Conceptual Problems from Hewitt 12 Edition Ch 18

Thermodynamics. 1st-Law.CP.PUB.4: If 100 J of heat added to a system that does no external work, by how much is the internal energy of the system raised?

Thermodynamics. 1st-Law.CP.PUB.5: If 100 J of heat is added to a system that does 40 J of external work, by how much is the internal energy of that system raised?

Thermodynamics. 1st-Law.CP.PUB.6: How does the law of conservation of energy relate to the first law of thermodynamics?

Thermodynamics. 1st-Law.CP.PUB.7: What is the relationship among heat added to a system, change in the system's internal energy, and external work done by the system?

Thermodynamics. 1st-Law. **CP.PUB.8:** What happens to the internal energy of a system when mechanical work is done on it? What happens to its temperature?