Chapter 1 GI Answers

1.1   First Law of Thermodynamics
1.1.1   cold gas is 50° C, hot gas is 100° C
1.1.2   cold gas is 70° C, hot gas is 80.14° C
1.1.3   from hot gas to cold gas
1.1.4   for cold gas, initial energy is 6.7×10^{-21} J; final energy is 7.1×10^{-21} J
1.1.5   for hot gas, initial energy is 7.7×10^{-21} J; final energy is 7.3×10^{-21} J
1.1.6   energy change of hot gas is -4×10^{-22} J; energy change of cold gas is $+4 \times 10^{-22}$ J
1.1.7 4×10^{-22} J of energy was transferred.
1.1.8   The total energy change of the system is zero.
1.1.9 ΔE(cold gas) = $-\Delta E$(hot gas)
1.1.10   2 kg
1.1.11   The paddles will spin.
1.1.12   0.98 J
1.1.13   0.98 J
1.1.14   It originally came from the loss in potential energy of the mass, which was transferred to the paddles, which in turn transferred it to the water.
1.1.15   0.98 J
1.1.16 ΔE(water)=w(mass); w = work done by the mass
1.1.17   0.98 J + 1.2 J = 2.18 J
1.1.18 ΔE(water) = w(mass) + h(brick); h = heat transferred from brick
1.1.19   Energy is conserved.

1.2.1   In Class 1 the instructor is responsible; in Class 2 the students are responsible.
1.2.2   Class 2.
1.2.3   There may be a variety of answers for this. Most likely it will be like Class 1.
1.2.4   They will likely answer Class 2. Section 1.1 was set up to be conducted in groups with the students figuring out the 1st Law of Thermodynamics themselves without it being defined by the instructor.
1.2.5   You will get a variety of answers. The answers to this question provide an opportunity to discuss the teaching philosophy for this class.
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1.2.7   You will get a variety of answers. The answers to this question provide an opportunity to discuss the teaching philosophy for this class.