WebAssign
CH12-HW02-SP12 (Homework)

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PHYS 172-SPRING 2012, Spring 2012
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Current Score : 11 / 11 **Due :** Tuesday, April 17 2012 11:59 PM EDT

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1. 3/3 points | Previous Answers MI3 12.3.X.038

Object *A* and object *B* are two identical microscopic objects. The table below shows the number of ways to arrange energy in one of these objects, as a function of the amount of energy in the object.

E (joules)	4e-21	6e-21	8e-21	1e-20	1.2e-20	1.4e-20	1.6e-20
# ways	6	20	37	60	90	122	148

When there are 1.2e-20 joules of energy in object *A*, what is the entropy of this object?

S_A = 6.3e-23 ✓ J/K

When there are 1.6e-20 joules of energy in object *B*, what is the entropy of this object?

S_B = 7.00e-23 ✓ J/K

Now the two objects are placed in contact with each other. At this moment, before there is time for any energy flow between the objects, what is the entropy of the combined system of objects *A* and *B*?

S_{AB} = 13.3e-23 ✓ J/K

- *Read the eBook*
- Section 12.3

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2. 2/2 points | Previous Answers MI3 12.5.X.037

Consider two blocks of copper. Block A contains 800 atoms and initially has a total of 20 quanta of energy. Block B contains 200 atoms and initially has 80 quanta of energy. The two blocks are placed in contact with each other, inside an insulated container (so no thermal energy can be exchanged with the surroundings).

After waiting for a long time (for example, an hour), which of the following would you expect to be true?

- [x] The temperature of block A and the temperature of block B are equal.
- [x] Approximately 80 quanta of energy are in block A, and approximately 20 quanta of energy are in block B.
- [ ] The entropy of block A is equal to the entropy of block B.
- [ ] Approximately 50 quanta of energy are in block A, and approximately 50 quanta of energy are in block B.

✓

- *Read the eBook*

- Section 12.5

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3. 2/2 points | Previous Answers MI3 12.5.X.008

There was transfer of energy of 4800 J due to a temperature difference into a system, and the entropy increased by 6 J/K. What was the approximate temperature of the system?

800 ✓ K

- *Read the eBook*
- Section 12.5

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4. 4/4 points | Previous Answers MI3 12.5.X.009

It takes about 81 joules to melt one gram of gallium. During the melting, the temperature stays constant. Which has higher entropy, a gram of liquid gallium at 3° C or a gram of solid gallium at 3° C (276 K)?

- (•) liquid
- ( ) solid

✓

How large is this difference in the entropy between the two forms of gallium?

0.2935 ✓ J/K

- *Read the eBook*
- Section 12.5