Web**Assign**
CH04-HW01-SP12 (Homework)

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PHYS 172-SPRING 2012, Spring 2012
Instructor: Virendra Saxena

Current Score : 19 / 19   **Due :** Tuesday, January 31 2012 11:59 PM EST

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1. 6/6 points | Previous Answers   MI3 4.4.X.022

A climber whose mass is 54 kg hangs motionless from a rope. What is the tension in the rope?

tension = [529.2] ✔ N

Later, a different climber whose mass is 75.6 kg hangs from the same rope. Now what is the tension in the rope?

tension = [740.88] ✔ N

Compare the physical state of the rope when it supports the heavier climber to the state of the rope when it supports the lighter climber. Which statements about the physical state of the rope are true? Check all that apply.

- ☑ The rope is slightly longer when it supports the heavier climber than when it supports the lighter climber.

- ☐ Because the same rope is used, the tension in the rope must be the same in both cases.

- ☑ The interatomic bonds in the rope are stretched more when the rope supports the heavier climber than when the rope supports the lighter climber.

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- *Read the eBook*
- Section 4.4

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2. 2/2 points | Previous Answers   MI3 4.4.X.023

Why are two balls connected by a spring a good model for two atoms connected by a chemical bond?

☑ If the two atoms get closer together than the equilibrium interatomic distance, they repel each other.

☑ The magnitude of the force one atom exerts on another is proportional to the stretch or compression of the bond between them.

☐ Each spring represents a real microscopic coiled metal wire that connects two adjacent atoms.

☑ If the two atoms get farther apart than the equilibrium interatomic distance, they attract each other.

✔

- *Read the eBook*
- [Section 4.4](#)

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3. 2/2 points | [Previous Answers](#)   MI3 4.4.X.024

Consider a 3 kg block of gallium modeled as an array of balls connected by springs. What is the mass in kg of a single "ball" in the ball-spring model? One mole (6.02×10^{23} atoms) of gallium has a mass of 70 grams, as shown in the periodic table on the inside front cover of the textbook.

○ 4.98×10^{-24} kg

○ 6.02×10^{23} kg

○ 42.9 kg

◉ 1.16×10^{-25} kg

○ 0.07 kg

○ 3 kg

✔

- *Read the eBook*
- [Section 4.4](#)

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4. 6/6 points | [Previous Answers](#)   MI3 4.4.X.026

The diameter of a copper atom is approximately 2.28e-10 m. The mass of one mole of copper is 64 grams. Assume that the atoms are arranged in a simple cubic array. Remember to convert to S.I. units.

What is the mass of one copper atom, in kg?

mass = | 1.06e–25 | ✔ kg

How many copper atoms are there in a cubical block of copper that is 4.8 cm on each side?
number of atoms = | 9.33e24 | ✔
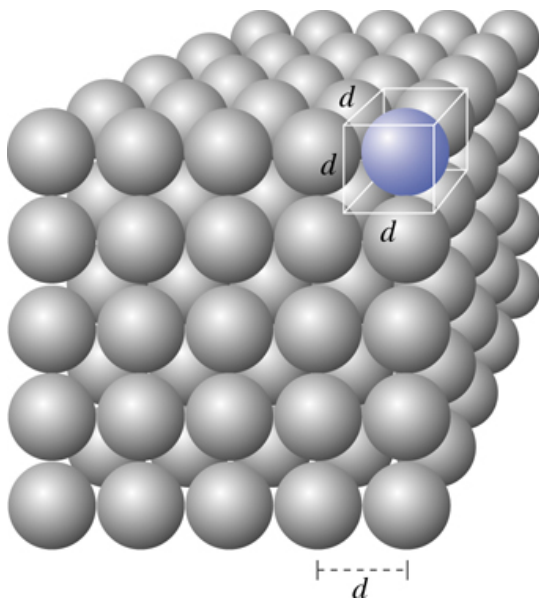
What is the mass of the cubical block of copper, in kg?
mass of block = | 0.992 | ✔ kg

- *Read the eBook*
- Section 4.4

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5. 3/3 points | Previous Answers   MI3 4.4.X.027

One mole of cadmium (6×10^{23} atoms) has a mass of 112 grams, as shown in the periodic table on the inside front cover of the textbook. The density of cadmium is 8.65 grams/cm^3. What is the approximate diameter of a cadmium atom (length of a bond) in a solid block of the material? Make the simplifying assumption that the atoms are arranged in a "cubic" array, as shown in the figure. Remember to convert to SI units.

d = | 2.78e–10 | ✔ m

- *Read the eBook*
- Section 4.4