

# Physics 117 HW #9 Problems

Ch 11 Q: 19, 28, 40; Ex 11, 17, 19  
Ch 13 Q: 1, 5; Ex 3, 7

19. How does the number of molecules in 1 liter of oxygen compare with the number of molecules in 1 liter of carbon dioxide if they are both at the same temperature and pressure?
28. Your right rear tire has to support a weight of 3000 newtons. Normally, the contact area of your tire with the road is 200 square centimeters. If the pressure in your tire is suddenly reduced from 32 pounds per square inch to 16 pounds per square inch, what must be the new contact area to support the car?
40. You move to Canada and find that the thermostat in your home is in Celsius degrees. You normally like your house about 72°F. To what should you set your new thermostat?
- \*11. One liter of nitrogen combines with 3 L of hydrogen to form 2 L of ammonia. If the molecules of nitrogen and hydrogen have two atoms each, how many atoms of hydrogen and nitrogen are there in one molecule of ammonia?
17. What happens to the volume of 1 L of an ideal gas when the pressure is tripled while the temperature is held fixed?
- \*19. A helium bottle with a pressure of 100 atm has a volume of 3 L. How many balloons can the bottle fill if each balloon has a volume of 1 L and a pressure of 1.25 atm?
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1. In an avalanche, the snow and ice begin at rest at the top of the mountain and end up at rest at the bottom. What happens to the gravitational potential energy that is lost in this process?
5. How are the concepts of work and heat the same? How are they different?
- \*3. How much work is required to push a crate with a force of 200 N across a floor a distance of 4 m? How many calories of thermal energy does the friction produce?
7. During a process, 28 J of heat are transferred into a system, while the system itself does 12 J of work. What is the change in the internal energy of the system?