

PHYS-2010: Dr. Luttermoser's General Physics I Course

Problem Set 4, Fall 2010

There are 6 problems you are to complete via the web at

<http://capa.etsu.edu/>

You will gain access to this set by typing in your CAPA Student Number and CAPA ID which have been supplied to you. These problems will be graded and must be completed by 6:00 p.m. on Monday, December 6, 2010. **Start working on these problems as soon as possible! Don't wait until the last day to start them. One never knows when the network will go down, and you will not be able to use this as an excuse for not doing your CAPA problems.** As a matter of fact, there will be no allowed excuses for not doing your CAPA homework.

The following problems will not be graded, but should be done for review. These problems are from your textbook (College Physics, 8th Edition, Serway & Vuille). The solutions are posted on the course web page. **Try to work these problems out by yourself before looking at the solutions I have supplied for you.**

1. A cylinder with a movable piston contains gas at a temperature of 27.0°C , a volume of 1.50 m^3 , and an absolute pressure of $0.200 \times 10^5\text{ Pa}$. What will be its final temperature if the gas is compressed to 0.700 m^3 and the absolute pressure increases to $0.800 \times 10^5\text{ Pa}$?
2. (a) What is the total random kinetic energy of all the molecules in 1 mole of hydrogen at a temperature of 300 K ? (b) With what speed would a mole of hydrogen have to move so that the kinetic energy of the mass as a whole would be equal to the total random kinetic energy of its molecules?
3. The temperature near the top of the atmosphere on Venus is 240 K . (a) Find the rms speed of hydrogen (H_2) at that point in Venus's atmosphere. (b) Repeat for carbon dioxide (CO_2). (c) It has been found that if the rms speed exceeds one-sixth of the planet's escape velocity, the gas eventually leaks out of the atmosphere into outer space. If the escape velocity on Venus is 10.3 km/s , does hydrogen escape? Does carbon dioxide?
4. Problem 10.58, Page 351.
5. Problem 12.15, Page 420.

6. Problem 12.37, Page 422.

7. Problem 12.51, Page 423.

8. Consider a standard deck of 52 playing cards that has been thoroughly shuffled. (a) What is the probability of drawing the ace of spades in one draw? (b) What is the probability of drawing any ace? (c) What is the probability of drawing any spade?