PHYS 101

Homework # 4
DUE DATE: October 21, 2008

Please do not submit copycat answers from the solutions book or some other solution you have in hand. You should at least show your understanding of the problem. Otherwise, this will be considered as cheating.

1) **Internet Treasure Hunt:** Using a net browser, find the following information and tell which WWW site you have located this info. Please also explain (in step by step) how you have reached to this information
a) The current distance between sun and Jupiter.
b) Physical constants, list only five of them, indicate the number of physical constant (with measurement errors) in your list you have found in internet.
c) The minimum gatewidth used in latest Pentium processors, and the number of transistors used in latest Pentium processors.
d) The top 25 Electrical Engineering departments in USA.
e) The number of Physics PhD's awarded by USA universities in year 2007.

2) Imagine a car involved in a head-on crash. The driver, whose mass is m, is to be brought uniformly to rest within the passenger compartment by compressing an inflated air bag through the distance s_c. Write an expression for average force exerted on the air bag in terms of m, vi, and s_c. Compute the average force for a 105 km/hr collision, where the drivers mass is 72 kg, and the allowed stopping distance of the air bag is 33 cm. Assume the car deforms only negligibly.

3) Discussion Questions 4.10, 4.20, 4.29, 4.41 in the text. Chapter 4.

4) Problem 4-34 in the text. Chapter 4.

5) Problem 4-38 in the text. Chapter 4.

6) Problem 4-40 in the text. Chapter 4.

7) Problem 4-46 in the text. Chapter 4.

8) During a parachute jump over Alaska in 1955, a trooper jumped from a C-110 at 5.00×10^2 meters, but his chute failed to open. He was found flat on his back at the bottom of 1.20 meter deep crater in the snow, alive and with only an incomplete fracture of the clavicle. Compute the average force that acted on him as he plowed into the snow. Assume the deceleration was constant; take his mass to be 95.0 kg, and his terminal speed to be 215 km/hr. First use algebraic symbols and then calculate the numerical values. Be careful for significant digits.