

AOS 100/101
Spring 2019

HOMework #1
(Due Fri. February 1)

Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences and you may elect to use a separate piece of paper for your answers. Don't forget to write your name on the paper!!!

NAME:

- 1) Two balls, A and B, composed of identical material (i.e. having the same density) are placed on a lab table and shot towards one another at the same speed. After colliding with each other, Ball A recoils 4 times farther from the point of impact than does Ball B. If Ball B has a radius of 3 cm, what is the radius of Ball A? Show your work and explain your answer.

(HINT: The work done by one ball on the other at the moment of contact is equal to the product of [Mass of the ball being pushed] \times [gravity] \times [distance the ball is pushed] where gravity is 9.81 m/s^2 .)

(15 pts)

- 2) If life had never evolved on Earth how would the chemical composition of the atmosphere be different than it is today? Explain your answer with reference to two important chemicals, one that is plentiful and one that is scarce, that are found in our atmosphere.

(10 pts)

- 3) You own a car that weighs 1920 pounds (lbs) and has 4 tires each of which was inflated to a pressure of 30 lbs per square inch (lbs in⁻²) in August. When the car is at rest the portion of the tire that makes contact with the ground is called its footprint. What was the original size of the footprint made by each tire in August? You notice in late January that a larger footprint is made by each tire. Explain why this happens in terms of the Ideal Gas Law.

(15 pts)