

AOS 100/101
Spring 2017

HOMework #1
(Due Fri. February 3)

Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences. Don't forget to write your name on the paper!!!

NAME:

1) Everyone knows that the wind can produce waves on the open water. In fact, the height of such waves varies exactly with the *kinetic energy* of the wind. One day you observe a 0.5 m wave height on Lake Mendota while a 15 m s^{-1} wind is blowing. How fast does the wind have to blow to create a 1.0 m wave height on the lake? Explain your reasoning and show your work.

(10 pts)

2) Photosynthesis by the first life forms on Earth radically changed the chemical composition of our atmosphere. Name two chemicals that were added to the atmosphere as direct or indirect consequences of photosynthesis and describe their respective effects on the subsequent evolution of life on Earth.

(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)