

ME 201

Thermodynamics

Homework #1: Conservation of Mass Due Wednesday, January 18, 2006

1. Describe mass conservation for a real world system such as the human body or a jet aircraft engine.
2. During an attack, the asthma sufferer actually accumulates air in his/her lungs causing great difficulty in respiration. A critical point comes when the accumulated air fills 75% of the lung capacity at which time medication becomes essential. The volume of lungs may be taken to be 0.006 m^3 and the air intake is $1.26 \times 10^{-6} \text{ kg/s}$ with only 85% of the intake exhausted during an attack. Determine the time it takes from the onset of an attack to the critical point when medication becomes essential. You may take the density of air to be 1.3 kg/m^3 .