6) ~~As~~ Modeling the Earth's atmosphere as a diatomic ideal gas with constant heat capacity $C_V = \frac{5}{2} N k_B T$, and assuming that it is in mechanical equilibrium (i.e., that pressure forces balance gravitational forces), and adiabatic, find ~~the~~ its temperature profile $T(z)$, the pressure profile $P(z)$, and the mass density profile $\rho(z)$, ~~of the~~ where z is height above the Earth's surface. Express your answer in terms of the acceleration due to gravity g (which you may take to be constant)

6) (cont) the temperature T_0 and pressure P_0 at the Earth's surface. ~~Evaluate your answer numerically using realistic values~~ Give a numerical answer for the temperature and ~~pressure~~ fractional density $\frac{\rho(z)}{\rho(0)}$ for ~~z = 8800 m~~ the summit of Qomalongma Feng (A.k.a. Mount Everest), taking $T_0 = 310°K$ (it's hot in India!), $z = 8800$ meters, $g = 9.8 \frac{m}{sec^2}$, and $m = \frac{1}{4} m_{O_2} + \frac{3}{4} m_{N_2}$, where m_{N_2} and m_{O_2} are respectively the masses of the diatomic nitrogen and diatomic oxygen that make

6) cont) up the Earth's atmosphere, in 3 to 1 proportion (hence the above weighting to determine the average molecular mass).