Additional problems on kinetic theory:
Hint: use $k/u=8311 m^2/(s^2 K)$ (u=unified atomic mass unit, k=Boltzmann constant)

1) A gas of nitrogen molecules has twice as many molecules moving at speed 2000 +/-1 m/s than at speed 1000 +/-1 m/s. Find its temperature, in K
Answer: 7290K

2) A gas of oxygen molecules has twice as many molecules moving with velocity 500 +/-1 m/s in the +x direction than moving with velocity 1000 +/-1 m/s in the +y direction. Find its temperature, in K
Answer: 2080K

3) A gas contains a mixture of equal number of He atoms and O_2 molecules. It has the same number of He atoms moving with velocity in the +x direction between 900m/s and 905m/s as of O_2 molecules moving with velocity in the -x direction between 450m/s and 460m/s. Find its temperature, in K
Answer: 281K

4) A gas at temperature 20 ^oC has the same number of molecules moving at speed 300 +/-1 m/s and at speed 600 +/-1 m/s. Find the molecular mass in u and the rms speed in m/s.
Answer: 25u, 540m/s