

Chemistry 163C Problem Set #7
Due Thursday, 5/22 at the beginning of class

- 1) Think of collection of molecules adsorbed to a surface, but with mobility along the surface, as a two-dimensional gas. a) Develop a 2D Maxwell Distribution following the same strategy used in class for 3D. Note that the volume element in polar coordinates is $v dv d\phi$. b) Sketch your distribution. c) Find the formula for the most probable speed and the average speed. How does this depend on temperature?
- 2) At 1.0 atm, air contains 78% N_2 and 21% O_2 . Determine the total collision frequencies $Z_{N_2N_2}$, $Z_{O_2O_2}$ and $Z_{O_2N_2}$.
- 3) A 1.0 L container filled with O_2 has an initial pressure of 1.0 atm. If you punch a hole in the container that measures 1.0 mm x 1.0 mm, what will be the pressure in the container after one hour? Assume that there is no backflow through the hole into the container.

From Engel & Reid 3rd Edition, Chapter 16, Problems: 3, 9, 14, 23, 25, 28, 29