Astro 118 – Physics of Planetary Systems
Problem Set #3, Winter 2014
Due in class on <u>Wednesday, February 5, 2014</u>

1) Read "Terrestrial Planet Formation," by John Chambers, from the volume *Exoplanets*, edited by Sara Seager (2010). The chapter can be found here:
http://www.dtm.ciw.edu/users/chambers/chambers_exoplanets.pdf
Pay particular attention to sections 1, 2, 3.3, and 4. In 1-1 ½ single-spaced pages, summarize the main physics of Sections 2.1 to 2.6, and how the important physics changes as the scale changes from the microscopic scale to the planetary scale.

2) Problem 3.2 from our book.

3) Problem 3.3 from our book.

4) a) Calculate the mass of gas that an embryo of radius R cm, orbiting at 1 AU from a solar-mass star, passes through (collides with) during one year. Assume that the gas density of the disk at this orbital location is 10^{-9} g/cm^3.
b) Assuming an embryo density of 3 g/cm^3, calculate the radius of an embryo that passes through its own mass of gas during one orbit.