Columbia University in the City of New York
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Chemistry C2407x, Fall 2003 **George Flynn**

Homework Assignment 1

Kinetic Theory of Gases

Note that assignments are provided for both the 4th and 5th editions of the required text by Oxtoby.Where the editions differ, citations for the 4th edition appear in square brackets.

Required reading, no lectures: Oxtoby section 4.2, pp 96-98, [101-103] (pressure units), problems 4.5, 4.6, 4.9, 4.10; and section 4.3, pp 103-105, [108-110] (units for R)

Lectures cover pages 108-116, [113-123] in Oxtoby (Sections 4.5, 4.6), and pages 198-205, [206-214] (Sections 7.2, 7.3)

Do Oxtoby Chapter 4 Problems: 4.41-4.43; 4.48, 4.49 and 4.52, 4.53. In problems 4.52, 4.53 you may ignore the part of the question having to do with diffusion. Also do Oxtoby Chapter 7 Problems: 7.1, 7.2.

In addition calculate the collision frequency for:

(a) a sample of oxygen at 1.00 atm. Pressure and 25^0 C

(b) a molecule of hydrogen in a region of interstellar space where the number density is 1.0×10^{10} molecules per cubic meter and the temperature is 30 K.

[Take the diameter of oxygen to be 2.92×10^{-10} meter and that of hydrogen to be 2.34×10^{-10} meter.]

You must hand in solutions to Problems 4.6, 4.10, 4.42, 4.48, 4.52, 7.2 and the collision frequency problem above, on or before class on 9/18/03. Be sure to make a copy of your solutions from which to study.

Binary Collision Model

Lectures cover pages 456-457, [472-473] in Oxtoby (Section 13.6), and pages 452-456, [468-472] (Section 13.5)

Do Oxtoby Chapter 13 Problems: 13.43, 13.44

Suggested date for finishing: 9/19/03. You do not need to hand in this assignment.

This ends the material for exam 1.