

Homework Set #7 Solutions (10/13 - 10/17):

Chapter 11: **Questions** 19, 28, 40 **Exercises** 14, 19

Questions:

19. They have the same number of molecules.
28. The tire must support the same weight. With half the pressure it must have double the contact area, which is 400 square centimeters.
40. Reference to Fig. 11-10 shows that the corresponding temperature is 22°C.

Exercises:

$$14. m_n = m_o \left(\frac{M_n}{M_o} \right) = 16 \text{ amu} \left(\frac{7 \text{ g}}{8 \text{ g}} \right) = 14 \text{ amu}$$

19. A typical glass holds about one-fourth of a liter. Assume most of the milk is water.

$$\# = \frac{1/4 L}{V_{atom}} = \frac{\frac{1}{4} \times 10^{-3} \text{ m}^3}{(10^{-10} \text{ m})^3} = 2.5 \times 10^{26}$$

Chapter 12: **Questions** 4, 8 **Exercises** 5, 9

Questions:

4. They have the same densities because they are both diamonds.
8. The water in the pipes expands upon freezing. The copper contracts.

Exercises:

$$5. V = \frac{M}{D} = \frac{70 \text{ kg}}{1000 \text{ kg/m}^3} = 0.07 \text{ m}^3$$

$$9. W = Mg = DVg = (1000 \text{ kg/m}^3)(1 \text{ m}^2 \times 10 \text{ m})(10 \text{ m/s}^2) = 100,000 \text{ N}$$

$$P = \frac{W}{A} = \frac{100,000 \text{ N}}{1 \text{ m}^2} = 100,000 \text{ Pa; same as atmospheric pressure}$$

