Section 16D – Kinetic Molecular Theory

Gas	a ($L^2 \cdot atm/mol^2$)	b (L/mol)	Gas	a ($L^2 \cdot atm/mol^2$)	b (L/mol)
Acetic Acid	17.71	0.1065	Hydrogen	0.2476	0.02661
Acetone	16.02	0.1124	Krypton	2.349	0.03978
Acetylene	4.516	0.0522	Mercury	8.200	0.01696
Ammonia	4.170	0.0371	Methane	2.283	0.04278
Benzene	18.24	0.1154	Methanol	9.649	0.06702
Carbon Dioxide	3.640	0.04267	Neon	0.2135	0.01709
Carbon Monoxide	1.505	0.03985	Nitrogen	1.370	0.0387
Carbon Tetrachloride	19.7483	0.1281	Oxygen	1.382	0.03186
Cyclohexane	23.11	0.1424	Propane	8.779	0.08445
Ethane	5.562	0.0638	Toluene	24.38	0.1463
Ethanol	12.18	0.08407	Water	5.536	0.03049
Helium	0.0346	0.0238	Xenon	4.250	0.05105

1) Give a brief description as to how temperature affects the kinetic energy of a gas particle.

2) Calculate the root-mean-square speed of a CO molecule and a Ne molecule at 27 °C. State which particle is faster and *explain why*. Your explanation should be a couple sentences.

3) Draw two graphs:
a) Graph the speed distribution of argon particles at 150 K and 885 K, label your curves.

b) Graph the speed distribution of N_2 and O_2, label the curves

4) What is the difference between effusion and diffusion?

5) Calculate the *real* pressure of 0.500 mol CCl_4 and 0.500 mol He in a 2.0 L container at 27 °C. What are the reasons for the difference in actual pressures between the two gases?

6) Why is there such a discrepancy between the *b* value between cyclohexane and benzene?

7) Which gas from the list above has the largest *a* value and why? Which gas listed above has the largest *b* value and why?