

Quiz #3

Name Key

1. Matching (Use a letter only once)

If $F(c)$ is the distribution of speeds for the molecules in an ideal gas, $\langle c \rangle$ is j

The a^2/V^2 term in the van der Waals equation accounts for the i of the gas particles.

The average translational energy of a mole of an ideal gas is f.

$Z_1 = \sqrt{2\pi}d^2\bar{c}(N/V)$ is h for a single molecule.

A heavier gas diffuses g than a lighter gas.

- a. faster
- b. $\langle c \rangle = \int c F(c)$
- c. volume
- d. $mv^2/2$
- e. mean free path
- f. $3RT/2$
- g. slower
- h. number of collisions/s
- i. attractive force
- j. $\langle c \rangle = \int c F(c) dc$

2. A gas at a pressure of 1 atm. consists of 1 mole of O_2 and 3 moles of N_2 at 300 K. What is the pressure of each gas at 400 K? Assume the volume remains constant.

At 300 K $P_{O_2} = 1/4 \text{ atm}$ and $P_{N_2} = 3/4 \text{ atm}$.

At 400 K $P_{O_2} = 1/4 \times \frac{400}{300} = 0.333 \text{ atm}$, $P_{N_2} = 3/4 \times \frac{400}{300} = 1.00 \text{ atm}$

3. This question addresses the speed distribution.

a) Does He or O_2 have the larger average speed at 300 K?

He

b) Sketch and compare the speed distributions for He and O_2 at 300 K.

