Differentiated Chemistry. Gas Variables Quiz Name: Answer Key

Solve for the following measurements. Be sure to show your work.

1. 4.58 atm = 4.64×10^5 Pa

$4.58\text{ atm} \left| \frac{101325\text{ Pa}}{1\text{ atm}} \right.$

2. 96.01 °F = 308.71 K

$T_K = \left(\frac{T_F - 32}{1.8}\right) + 273.15$

3. 39.88 mmHg = 5.317 kPa

$39.88\text{ mmHg} \left| \frac{101.325\text{ kPa}}{760\text{ mmHg}} \right.$

4. 2.38 mol H_2 @STP = 53.3 L

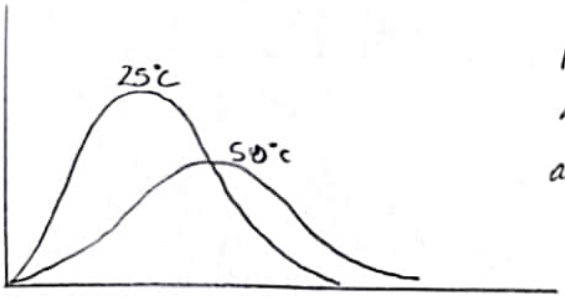
$2.38\text{ mol } H_2 \left| \frac{22.4\text{ L}}{1\text{ mol } H_2} \right.$

5. 23.75 atm = 5.027×10^4 lbs/ft^2

$23.75\text{ atm} \left| \frac{14.7\text{ lb}}{1\text{ atm} \cdot \text{in}^2} \right| \frac{12^2\text{ in}^2}{1\text{ ft}^2}$

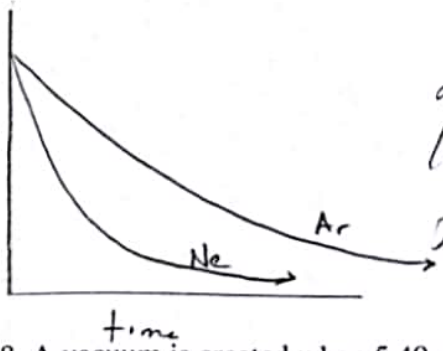
Answer the following questions:

6. A sample of neon gas is heated from 25°C to 50°C. Show the kinetic energy change of the particles by using a Maxwell-Boltzman distribution graph.



At higher temps the range is greater. average K.E (or root mean square-u) is greater and abundance @ average KE is less

7. A tank containing equal concentrations of argon and neon develops a small leak. What changes in gas concentration occurs in the tank over time. Explain thoroughly.



Neon's partial pressure (or concentration) will decrease at a higher rate as compared to Argon. According to Graham's law, the rates of effusion are inversely proportional to the ratio of masses

$$\frac{V_{Ne}}{V_{Ar}} = \sqrt{\frac{m_{Ar}}{m_{Ne}}} = \sqrt{\frac{40}{A}} = 3.16 \times s$$

8. A vacuum is created when 5.40 moles of hydrogen, 2.90 moles of helium and 3.33 moles of argon gas are removed from a 4.5 L tank at a temperature of 24.6 °C. What is the final pressure in the tank? Explain how you derived your answer.

No pressure. A vacuum is the absence of a gas and therefore without gas particles, there cannot be pressure.