

The Benchmark Exam will be ~25 questions long and you will have ~50 minutes to take the test, so you will have ~2 minutes per question. This practice test is meant to be timed to a similar time frame as the Benchmark. Please complete this test in only 20 minutes and see how much of the test you were able to complete. This should give you an idea of how long the test will be.

THIS PRACTICE TEST DOES NOT HAVE AN EXAMPLE OF EVERY TYPE OF QUESTION ON THE TEST! MAKE SURE TO DO THE BENCHMARK #1 PRACTICE PROBLEMS FOR THE BEST IDEA OF WHAT WILL BE ON THE TEST. THIS IS JUST TO PRACTICE TIMING!

$$760 \text{ mmHg} = 760 \text{ torr} = 1 \text{ atm}$$

$$R = 0.0821 \frac{\text{L} \cdot \text{atm}}{\text{K} \cdot \text{mol}} = 8.31 \frac{\text{L} \cdot \text{kPa}}{\text{K} \cdot \text{mol}} = 62.4 \frac{\text{L} \cdot \text{mmHg}}{\text{K} \cdot \text{mol}}$$

- 1) If the atmospheric pressure is 1.2 atm, what is the pressure in mmHg?
 - A) 912
 - B) 0.0016 mmHg
 - C) 0.099 mmHg
 - D) 912 mmHg
 - E) 0.0016
- 2) A gas sample is held at constant pressure. The gas occupies 4.1 L of volume when the temperature is 22.4 °C. Determine the temperature at which the volume of the gas is 3.8 L.
 - A) 274 °C
 - B) 20.76 K
 - C) 20.76 °C
 - D) 4602 K
 - E) 274 K
- 3) Gaseous water is held in two separate containers at identical temperature and pressure. The volume of container #1 is 2.3 L and it contains 7.4 moles of the gas. The volume of container #2 is 3.5 L. How many moles of the gas are in container #2?
 - A) 4.9 moles
 - B) 1.1 moles
 - C) 11.3 moles
 - D) 0.16 moles
 - E) 59.6 moles
- 4) A gas sample is heated from -30 °C to 72 °C and the volume is increased from 2.3 L to 3.7 L. If the initial pressure is 0.25 atm, what is the final pressure?
 - A) 0.18 atm
 - B) 0.22 atm
 - C) 1.5 atm
 - D) -0.37 atm
 - E) 5.7 atm

- 5) A sample of oxygen gas has a volume of 4.6 L at 28 °C and 900 torr. How many oxygen molecules does it contain?
- A) 0.22
 - B) 1.3
 - C) 0.22×10^{23}
 - D) 1.3×10^{23}
 - E) 1.4×10^{24}
- 6) You have a 500 mL beaker containing 32% H₂, 17% He, and 51% O₂ by mass at 30 °C and 1.7 atm total pressure. You heat the container to 100 °C. Calculate the total pressure.
- A) 2.1 atm
 - B) 5.7 atm
 - C) 0.48 atm
 - D) 58.8 atm
 - E) 1.4 atm
- 7) Which conditions of Pressure (P), Temperature (T), and number of moles (n) makes a gas behave the most ideally?
- A. Low P, high T, low n
 - B. High P, high T, high n
 - C. Low P, low T, low n
 - D. High P, low T, high n
 - E. Low P, high T, low n
- 8) 8.3 g of H₂O turns to gas inside a container. The final volume of the container is 1.5 L at 250 K. What is the pressure of the gas?
- A) 11495.5 kPa
 - B) 6.29 kPa
 - C) 113.6 kPa
 - D) 24048.6 kPa
 - E) 637 kPa
- 9) Consider the following unbalanced equation: $\text{O}_{2(g)} + \text{H}_{2(g)} \rightarrow \text{H}_2\text{O}_{(g)}$ 2.6 g of oxygen reacts with hydrogen. What is the total volume of gas present after the reaction is complete? Assume the reaction takes place at STP.
- A) 2.9 L
 - B) 3.6 L
 - C) 0.08 L
 - D) 1.82 L
 - E) 0.16 L
- 10) Which of the following is true about kinetic molecular theory?
- A. Gas particles repel each other, but do not attract one another.
 - B. The volume of a gas particle is considered to be small – about 0.1 mL
 - C. Pressure is due to the collisions of the gas particles with the walls of the container.
 - D. Adding an ideal gas to a closed container will cause an increase in temperature.
 - E. At least two of the above statements are correct.