

## Practice Exam Ideal Gases

1) Which of the following is NOT part of the Kinetic Molecular Theory?

- A) The average energy of the particles is dependent on the molecular mass of the particle.
- B) There is a large distance between gas particles as compared to their relative size.
- C) The size of the actual gas particles is small compared to the volume of the whole gas.
- D) Gas particles do not repel each other.
- E) All of the above statements are part of the Kinetic Molecular Theory.

2) 1 atm is equal to:

- A) 760 torr.
- B) 101,325 Pa.
- C) 760 mm Hg.
- D) 14.7 psi.

3) To solve problems using Boyle's Law, which mathematical equation should be used?

- A)  $P_1V_1 = P_2V_2$
- B)  $P_2V_1 = P_1V_2$
- C)  $\frac{P_1}{V_1} = \frac{P_2}{V_2}$
- D)  $\frac{V_1}{P_1} = \frac{V_2}{P_2}$

4) To solve problems using Charles's Law, which mathematical equation should be used?

- A)  $P_2V_1 = P_1V_2$
- B)  $T_1V_1 = T_2V_2$
- C)  $\frac{P_1}{V_2} = \frac{P_2}{V_1}$
- D)  $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

5) To solve problems using Avogadro's Law, which mathematical equation should be used?

- A)  $\frac{V_1}{n_1} = \frac{V_2}{n_2}$
- B)  $n_1V_1 = n_2V_2$
- C)  $\frac{n_1}{P_1} = \frac{n_2}{P_2}$
- D)  $P_1V_1 = P_2V_2$

6) Gas density can be calculated by dividing the mass of gas by its volume. If you took a balloon of gas and then warmed the balloon in a sunny window, what can now be said about the density of the gas in the balloon?

- A) The gas density will decrease.
- B) The gas density will increase.
- C) The gas density will remain the same.
- D) The density of gases is independent of temperature.

7) What is the final volume of a gas that initially occupies 2.50 L at 298 K and is subsequently heated to 321 K?

- A) 2.32 L
- B) 2.23 L
- C) 2.69 L
- D) 2.96 L

8) What is the *change* in temperature of a 2.50 L system when its volume is reduced to 1.75 L if the initial temperature was 298 K?

- A) 290 K
- B) 209 K
- C) -89 K
- D) -98 K

9) What is the initial temperature of a gas if the volume changed from 1.00 L to 1.10 L and the final temperature was determined to be 255.0°C?

- A) 480°C
- B) 232°C
- C) 207°C
- D) -41°C

10) What is the final pressure (expressed in atm) of a 3.05 L system initially at 724 mm Hg and 298 K, that is compressed to a final volume of 2.51 L at 273 K?

- A) 1.60      B) 860  
C) 1.06      D) 806

11) If the number of moles of a gas initially contained in a 2.10 L vessel is doubled, what is the final volume of the gas in liters? (Assume the pressure and temperature remain constant.)

- A) 4.20      B) 8.40  
C) 1.05      D) 6.30

12) A balloon originally had a volume of 0.439 L at 44°C and a pressure of 729 torr. To what temperature must the balloon be cooled to reduce its volume to 378 mL if the pressure remained constant?

- A) 95°C      B) 273°C  
C) 38°C      D) 0°C

13) What is the pressure of a 3.00 L gas vessel that has 18.0 grams of helium at 25°C?

(R= 0.0821 L atm/ mol K)

14) What is the temperature (°C) of 2.48 moles of gas stored in a 30.0 L container at 1559 mm Hg?

(R= 0.0821 L atm/ mol K)

15) What is the molecular weight of a gas if a 21.0 g sample has a pressure of 836 mm Hg at 25.0°C in a 2.00 L flask?

(R= 0.0821 L atm/ mol K)

- A) 234 amu      B) 1.89 amu  
C) 11.1 amu      D) 243 amu

16) A 3.76 g sample of a noble gas is stored in a 2.00 L vessel at 874 torr and 25°C. What is the noble gas?

(R= 0.0821 L atm/ mol K)

17) A gas cylinder contains only the gases radon, nitrogen, and helium. The radon has a pressure of 222 torr while the nitrogen has a pressure of 446 torr. If the total pressure inside the cylinder is 771 torr, what is the pressure that is due to the helium?

- A) 103 torr      B) 668 torr  
C) 771 torr      D) 549 torr

1) A   2) E   3) A   4) D   5) A   6) A   7) C   8) C   9) C   10) C   11) A   12) D

13) 36.7 atm   14) 29   15) A   16) Ar   17) A