1. At STP, 1.0 liter of helium contains the same total number of atoms as

   A) 1.0 L of Ne B) 2.0 L of Kr
   C) 0.5 L of Rn D) 1.5 L of Ar

2. At STP, which sample contains the same number of molecules as 11.2 liters of $CO_2(g)$ at STP?

   A) 5.6L of $NO_2(g)$ B) 7.5 L of $H_2(g)$
   C) 11.2 L of $N_2(g)$ D) 22.4 L of $CO(g)$

3. At STP, a 22.4-liter sample of $NH_3(g)$ contains the same number of molecules as

   A) 11.2 L of $H_2(g)$ B) 22.4 L of $CO_2(g)$
   C) 33.6 L of $CH_4(g)$ D) 44.8 L of $O_2(g)$

4. At STP, 5.6 liters of CH_4 contains the same number of molecules as

   A) 1.4 L of oxygen B) 2.5 L of ammonia
   C) 5.6 L of hydrogen D) 11.2 L of neon

5. The table below shows the temperature, pressure, and volume of five samples.

Sample	**Substance**	**Temperature (K)**	**Pressure (atm)**	**Volume (L)**
A	He	273	1	22.4
B	O_2	273	1	22.4
C	Ne	273	2	22.4
D	N_2	546	2	44.8
E	Ar	546	2	44.8

   Which sample contains the same number of molecules as sample *A*?

   A) *E* B) *B* C) *C* D) *D*

6. Which two samples of gas at STP contain the same total number of molecules?

   A) 1 L of $CO(g)$ and 0.5 L of $N_2(g)$
   B) 2 L of $CO(g)$ and 0.5 L of $NH_3(g)$
   C) 1 L of $H_2(g)$ and 2 L of $Cl_2(g)$
   D) 2 L of $H_2(g)$ and 2 L of $Cl_2(g)$

7. A sample of oxygen gas is sealed in container X. A sample of hydrogen gas is sealed in container Z. Both samples have the same volume, temperature, and pressure. Which statement is true?

   A) Container X contains more gas molecules than container Z.
   B) Container X contains fewer gas molecules than container Z.
   C) Containers X and Z both contain the same number of gas molecules.
   D) Containers X and Z both contain the same mass of gas.

8. At the same temperature and pressure, 1.0 liter of $CO(g)$ and 1.0 liter of $CO_2(g)$ have

   A) equal masses and the same number of molecules
   B) different masses and a different number of molecules
   C) equal volumes and the same number of molecules
   D) different volumes and a different number of molecules

9. At STP, 1 liter of $H_2(g)$ and 1 liter of $He(g)$ have the same

   A) mass
   B) density
   C) number of atoms
   D) number of molecules

10. Equal volumes of $SO_2(g)$ and $O_2(g)$ at STP contain the same number of

   A) atoms
   B) molecules
   C) electrons
   D) protons