Assumptions of the Gas Laws

Aim

- to describe ideal gases

Notes

Kinetic theory of gases (under ideal circumstances)

- ★ Gas are composed of particles that are in constant, rapid, random, linear motion.
- ★ Collisions between gas particles are elastic so no energy is lost. As a result, the pressure of a gas at a constant temperature and volume remains constant
- ★ The volume of the particles of a gas is so small compared to the distance between them, it is considered zero. The gas is mostly space.
- ★ There is no attraction or repulsion between gas molecules
- ★ The average kinetic energy of the molecules of a gas is directly proportional to the Kelvin temperature of the gas

Deviations from ideal gases

- ★ Particles of gas do have volume
- ★ Gas particles do exert forces on each other

Optimum conditions

- ★ High temperature
- ★ Low pressure
- ★ Low molecular mass

Answer the questions below by circling the number of the correct response

1. Which gas will most closely resemble an ideal gas at STP?
   1) SO_2 3) Cl_2
   2) NH_3 4) H_2

2. At STP, which gas would most likely behave as an ideal gas?
   (1) H_2 (3) Cl_2
   (2) CO_2 (4) SO_2

3. Which gas has properties that are most similar to those of an ideal gas?
   (1) O_2 (3) NH_3
   (2) H_2 (4) HCl

4. Under which conditions does a real gas behave most like an ideal gas?
   1 at high temperatures and low pressures
   2 at high temperatures and high pressures
   3 at low temperatures and low pressures
   4 at low temperatures and high pressures

5. Under the same conditions of temperature and pressure, which of the following gases would behave most like an ideal gas?
   (1) He(g) (3) Cl_2(g)
   (2) NH_3(g) (4) CO_2(g)

6. Which gas has properties that are most similar to those of an ideal gas?
   (1) N_2 (3) He
   (2) O_2 (4) Xe

7. One reason that a real gas deviates from an ideal gas is that the molecules of the real gas have
   1 a straight-line motion
   2 no net loss of energy on collision
   3 a negligible volume
   4 forces of attraction for each other