CONCEPT: KINETIC MOLECULAR THEORY

- An ideal gas: is an imaginary gas that acts as though it is alone by behaving independently of other gases around it.
  - □ **The Kinetic Molecular Theory** uses data of real gases to predict how ideal gases would behave if they existed.

EXAMPLE: Which conditions of P and T make for the most ideal gas?

a) High P, high T b) Low P, low T c) Low P, high T d) None of the choices

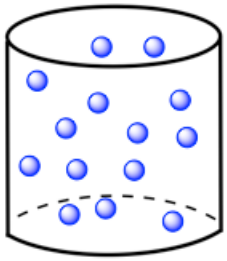
Kinetic Molecular Theory Postulates

Kinetic Molecular Theory

Postulate 1 – Volume

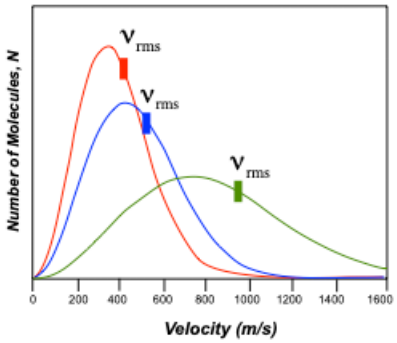
1 The size of the gas particle is significantly small and negligible when compared to the volume of the container.

□ The volume of a gas particle is _____ of the total volume in the container.



Postulate 2 – Temperature

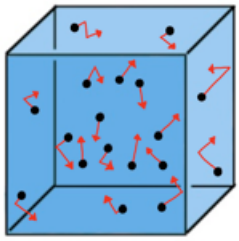
2 As the temperature ____ the molecules moving at higher velocities ____.



Postulate 3 – Forces

3 The collision between gas particles and the walls of the container are completely _____.

□ No _____ or _____ forces between gases and walls of container.



PRACTICE: Which of the following statements would correctly explain the non-ideal behavior of a gas based on the Kinetic Molecular Theory (KMT)?

a) At high temperatures the attractive forces between molecules becomes negligible.

b) At high pressure the volume of gas molecules become significant.

c) An increase or decrease in the moles of gas causes the gas constant value to change.

CONCEPT: KINETIC MOLECULAR THEORY

PRACTICE: Which of the following statements is/are true for gas molecules according to the Kinetic Molecular Theory?

I. Increasing the amount of gas molecules increases the pressure by increasing the force of the collisions.

II. Decreasing the temperature of a gas decreases the pressure by increasing the force of the collisions.

III. Decreasing the volume of a gas increases pressure by increasing the frequency of the collisions.

a) I only b) II only c) III only d) I and II e) II and III

PRACTICE: Which statement is TRUE about kinetic molecular theory?

a) A single particle does not move in a straight line.

b) The size of the particle is large compared to the volume.

c) The collisions of particles with one another is completely elastic.

d) The average kinetic energy of a particle is not proportional to the temperature.

PRACTICE: Based on the kinetic-molecular theory, which of the following is/are true?

I. At a given temperature, all gases have the same average kinetic energy.

II. At a given temperature, different gases have the same average velocities.

III. The average kinetic energy is proportional to the absolute temperature.

a. I only
b. II only
c. I & III only
d. I, II & III