13.1 THE NATURE OF GASES

Section Review

Objectives

- Describe the assumptions of the kinetic theory as it applies to gases
- Interpret gas pressure in terms of kinetic theory
- Define the relationship between Kelvin temperature and average kinetic energy

Vocabulary

- kinetic energy
- kinetic theory
- gas pressure
- vacuum
- atmospheric pressure
- barometer
- pascal (Pa)
- standard atmosphere (atm)

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

The kinetic theory describes the __1__ of particles in matter

and the forces of attraction between them. The theory assumes

that the volume occupied by a gas is mostly __2__, that the

particles of gas are relatively __3__, move __4__ of each other,

and are in constant __5__ motion. The __6__ between

particles are perfectly elastic so that the total __7__ remains

constant. Gas pressure results from the simultaneous collisions

of billions of particles with an object. Barometers are used to

measure __8__ pressure. Standard conditions are defined

as a temperature of __9__ and a pressure of __10__.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ **11.** Atmospheric pressure is 760 mm Hg.

_____ **12.** The SI unit of pressure is the pascal.

_____ **13.** Atmospheric pressure increases as you climb a mountain because the density of Earth's atmosphere decreases with altitude.

_____ **14.** When particles of a substance are heated, some of the energy is absorbed by the particle and stored in the form of potential energy.

_____ **15.** The Kelvin temperature of a substance is directly proportional to the total kinetic energy of the particles in the substance.

_____ **16.** At any given temperature, the particles of all substances have the same average kinetic energy.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ **17.** vacuum	**a.** an instrument used to measure atmospheric pressure
_____ **18.** kinetic energy	**b.** a space where no particles of matter exist
_____ **19.** gas pressure	**c.** the energy an object has because of its motion
_____ **20.** atmospheric pressure	**d.** results from the force exerted by a gas per unit surface area of an object
_____ **21.** barometer	**e.** results from the collisions of atoms and molecules in air with objects

Part D Questions and Problems

Answer the following in the space provided.

22. A gas is at a pressure of 4.30 atm. What is this pressure in kilopascals? In mm Hg?

23. Describe the motion of particles of a gas according to kinetic theory.

_____

_____

_____

_____

24. What simple evidence demonstrates that gas particles are in constant motion?

_____