3. What is meant by "the pressure of the atmosphere"? What causes this pressure?

4. Describe a simple mercury barometer. How is such a barometer used to measure the pressure of the atmosphere?

5. One *standard atmosphere* of pressure is equivalent to _____ pascals.

6. One *standard atmosphere* of pressure is equivalent to _____ mm Hg.

PROBLEMS

7. Convert the following pressures into *atmospheres*.
   a. 657 mm Hg
   b. 862 torr
   c. 117.8 kPa
   d. 121,500 Pa

8. Convert the following pressures into *atmospheres*.
   a. 105.2 kPa
   b. 75.2 cm Hg
   c. 752 mm Hg
   d. 767 torr

9. Convert the following pressures into units of *mm Hg*.
   a. 1.045 atm
   b. 103.2 kPa
   c. 75.2 cm Hg
   d. 101,700 Pa

10. Convert the following pressures into units of *mm Hg*.
    a. 0.9975 atm
    b. 225,400 Pa
    c. 99.7 kPa
    d. 1.078 atm

11. Convert the following pressures into pascals.
    a. 774 torr
    b. 0.965 atm
    c. 112.5 kPa
    d. 801 mm Hg

12. Convert the following pressures to units of kilopascals.
    a. 2.07×10^6 Pa
    b. 795 mm Hg
    c. 10.9 atm
    d. 659 torr

12.2 ■ *Pressure and Volume: Boyle's Law*

QUESTIONS

13. The volume of a sample of gas has increased (at constant temperature); therefore, the pressure on the sample of gas must have _____.

14. When the volume of a sample of gas is decreased, the pressure of the sample of gas _____.

15. The volume of a sample of ideal gas is inversely proportional to the _____ on the gas at constant temperature.

16. A mathematical expression that summarizes Boyle's law is _____.

PROBLEMS

17. For each of the following sets of pressure/volume data, calculate the missing quantity. Assume that the temperature and the amount of gas remain constant.
    a. V = 53.2 mL at 785 mm Hg; V = ? at 700 mm Hg
    b. V = 2.25 L at 1.67 atm; V = 2.00 L at ? atm
    c. V = 5.62 L at 695 mm Hg; V = ? at 1.51 atm

18. For each of the following sets of pressure/volume data, calculate the missing quantity. Assume that the temperature and the mass of gas remain constant.
    a. V = 541 mL at 1.00 atm; V = ? at 699 torr
    b. V = 2.32 L at 110.2 kPa; V = ? at 0.995 atm
    c. V = 4.15 mL at 135 atm; V = 10.0 mL at ? mm Hg

19. For each of the following sets of pressure/volume data, calculate the missing quantity. Assume that the temperature and the amount of gas remain constant.
    a. V = 19.3 L at 102.1 kPa; V = 10.0 L at ? kPa
    b. V = 25.7 mL at 755 torr; V = ? at 761 mm Hg
    c. V = 51.2 L at 1.05 atm; V = ? at 112.2 kPa

20. For each of the following sets of pressure/volume data, calculate the missing quantity. Assume that the temperature and the amount of gas remain the same.
    a. V = 291 mL at 1.07 atm; V = ? at 2.14 atm
    b. V = 1.25 L at 755 mm Hg; V = ? at 3.51 atm
    c. V = 2.71 L at 101.4 kPa; V = 3.00 L at ? mm Hg

21. The pressure on a 425-mL sample of gas is decreased from 855 mm Hg to 759 mm Hg. What will the new volume of the gas be (at constant temperature)?

22. If the pressure exerted on the gas in a weather balloon decreases from 1.01 atm to 0.562 atm as it rises, by what factor will the volume of the gas in the balloon increase as it rises?

23. A 1.04-L sample of gas at 759 mm Hg pressure is expanded until its volume is 2.24 L. What will be the pressure in the expanded gas sample (at constant temperature)?

24. What pressure (in atmospheres) is required to compress 1.00 L of gas at 760. mm Hg pressure to a volume of 50.0 mL?

12.3 ■ *Volume and Temperature: Charles's Law*

QUESTIONS

25. What is meant by the *absolute zero* of temperature?

26. How can Charles's law be used to determine absolute zero?