Chapter 13 Multiple Choice Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. The most abundant gas in Earth’s atmosphere is:
   a. nitrogen.
   b. water vapor.
   c. oxygen.
   d. carbon dioxide.

____ 2. Compared to aneroid barometers, mercury barometers are less desirable because they are:
   a. less accurate.
   b. more dangerous.
   c. too costly.
   d. difficult to read.

____ 3. The primary source of nitrogen for the proteins in our body tissues is nitrogen:
   a. released as a gas by volcanoes.
   b. released by dead and decaying organisms into the air.
   c. absorbed directly from the air.
   d. found in plant and animal proteins we eat.

____ 4. Which is the most abundant gas found in the atmospheres of both Venus and Mars?
   a. Carbon dioxide
   b. Nitrogen
   c. Oxygen
   d. Argon

____ 5. What substance in our atmosphere has been significantly reduced by the process of photosynthesis?
   a. Hydrogen
   b. Oxygen
   c. Carbon dioxide
   d. Glucose

____ 6. The measurement of the force of air molecules in the atmosphere at a given altitude is called:
   a. gravity.
   b. atmospheric pressure.
   c. atmospheric volume.
   d. sea level.

____ 7. At sea level, the weight of the atmosphere on a human body is about:
   a. 9,800 N
   b. 980 N
   c. 98 N
   d. 9.8 N

____ 8. An instrument designed to measure atmospheric pressure is called a:
   a. thermometer.
   b. speedometer.
   c. tachometer.
   d. barometer.
9. Units used to measure atmospheric pressure include all of the following EXCEPT:
   a. pascals.
   b. newtons.
   c. atmospheres.
   d. millibars.

10. Which of the following is the largest unit of atmospheric pressure?
   a. 1 pascal
   b. 1 millibar
   c. 1 pound per square inch
   d. 1 millimeter of mercury

11. According to Figure 13-1, the atmospheric pressure at an altitude of 22 kilometers is about:
   a. 200 mb
   b. 300 mb
   c. 600 mb
   d. 800 mb

12. According to Figure 13-1, compared to the air pressure at an altitude of 4 kilometers, the air pressure at 16 kilometers is:
   a. two times as large
   b. four times as large
   c. one-half as great
   d. one-fourth as great
13. According to Figure 13-1, the relationship between air pressure and altitude:
   a. is a direct relationship.
   b. is an inverse relationship.
   c. shows no relationship.
   d. cannot be determined using the diagram.

14. According to Figure 13-1, the atmospheric pressure measured in pascal units (Pa) at an altitude of 8000 meters is:
   a. 600 Pa
   b. 6000 Pa
   c. 60,000 Pa
   d. 600,000 Pa

15. The scientific law relating pressure and volume of a gas is known as:
   b. Pascal’s law.
   c. Boyle’s law.
   d. Bernoulli’s law.

16. According to Boyle’s law, the volume and pressure of a fixed quantity of gas are:
   a. show no relationship.
   b. are inversely related.
   c. directly related.
   d. independently related

17. The scientific law relating the volume and temperature of a gas maintained at constant mass and pressure is called:
   a. Pascal’s law.
   b. Boyle’s law.
   d. Guy-Lussac’s law.

18. A hot air balloon will rise in air because:
   a. the volume of air inside the balloon is less than the volume of air outside the balloon.
   b. the mass of the air inside the balloon is less than the mass of the air outside the balloon.
   c. the density of air inside the balloon is less than the density of air outside the balloon.
   d. the temperature of the air rises as the balloon gets closer to the Sun.

19. The temperature scale that must be used when doing calculations with Charles’ law and Guy-Lussac’s law is the:
   a. Kelvin scale.
   b. Fahrenheit scale.
   c. Celsius scale.
   d. centigrade scale.

20. A 50-gram mass of gas occupying 3.0 m$^3$ at a pressure 4.0 atmospheres is allowed to expand at constant temperature. If the resulting pressure of the gas is 1.0 atmosphere, the new volume occupied by the gas will be:
   a. 3 m$^3$
   b. 4 m$^3$
   c. 7 m$^3$
   d. 12 m$^3$
Graphs 13-2 represent different relationships in physical science.

21. Which of Graphs 13-2 correctly represents the relationship between the pressure and Kelvin temperature of a gas?
   a. A  
   b. B  
   c. C  
   d. D

22. Which of Graphs 13-2 correctly represents the relationship between the mass and Kelvin temperature of an enclosed gas?
   a. A  
   b. B  
   c. C  
   d. D

23. Which of Graphs 13-2 correctly represents the relationship between the pressure and volume of a gas?
   a. A  
   b. B  
   c. C  
   d. D

24. Which of Graphs 13-2 correctly represents the relationship between the volume and Kelvin temperature of a gas?
   a. A  
   b. B  
   c. C  
   d. D

25. Referring to Graphs 13-2, as the Kelvin temperature of a gas increases, the average kinetic energy of the molecules is best represented by:
   a. A  
   b. B  
   c. C  
   d. D

26. The same amount of air is pumped into two containers. Container A has a volume of 10 liters. Container B has a volume of 5 liters. Both containers are held at the same temperature. Which statement below is true?
   a. The pressure in container A is equal to half of the pressure in container B.
   b. The pressure in container A is equal to twice the pressure in container B.
   c. The pressure in container B is equal to half of the pressure in container A.
   d. The pressure in both containers is the same.
27. Which of the following relationships correctly represents Guy-Lussac’s law?
   a. \( P_1 V_1 = P_2 V_2 \)
   b. \( \frac{P_1}{V_1} = \frac{P_2}{V_2} \)
   c. \( P_1 T_1 = P_2 T_2 \)
   d. \( \frac{P_1}{T_1} = \frac{P_2}{V_2} \)

28. The gas law which is best able to explain why a hot air balloon rises in air is:
   a. Boyle’s law.
   c. Guy-Lussac’s law.
   d. Pascal’s law.

29. If the pressure of a fixed mass of gas is doubled at a constant temperature, the volume of the gas will be:
   a. half as much.
   b. the same.
   c. twice as much.
   d. 1/4 as much.

30. The Celsius temperature of a fixed mass of gas is increased from 2°C to 4°C while the pressure remains constant. The volume of the gas will be:
   a. half as much.
   b. doubled.
   c. the same.
   d. increased slightly.