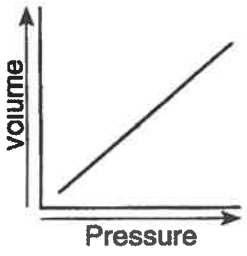
1. At constant pressure, 200. milliliters of a gas at 10.°C is heated to 27°C. The new volume of the gas, in milliliters, is equal to

(1) $200 \times \frac{300}{283}$ (3) $200 \times \frac{27}{10}$

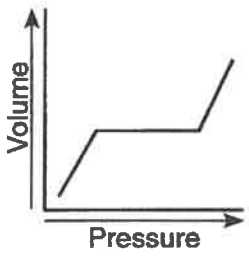
(2) $200 \times \frac{283}{300}$ (4) $200 \times \frac{10}{27}$

2. Which graph best shows the change in the volume of 1 mole of nitrogen gas as pressure increases and temperature remains constant?

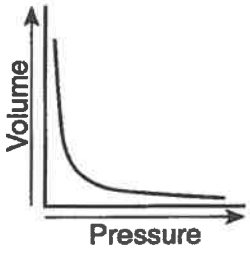
(1)



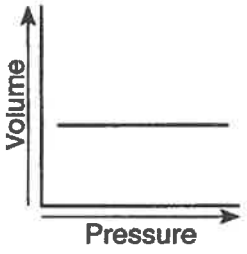
(3)



(2)



(4)



3. An ideal gas is made up of gas particles that
   (1) have volume
   (2) can be liquefied
   (3) attract each other
   (4) are in random motion

4. At a constant pressure, how does the volume of 1 mole of an ideal gas vary?
   (1) indirectly with the mass of the gas
   (2) directly with the mass of the gas
   (3) indirectly with the Kelvin temperature
   (4) directly with the Kelvin temperature

5. If the pressure on a 3.0-liter sample of a gas is doubled at constant temperature, the new volume will be
   (1) 6.0 L
   (2) 9.0 L
   (3) 0.75 L
   (4) 1.5 L

6. Which gas would behave most nearly like an ideal gas at STP?
   (1) NH_3
   (2) Cl_2
   (3) H_2
   (4) CO_2

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

8. A sample of gas occupies 15.0 liters at a pressure of 2.00 atmospheres and a temperature of 300. K. If the pressure is lowered to 1.00 atmosphere and the temperature is raised to 400. K, the volume of the gas sample would be
   (1) 10.0 L
   (2) 5.63 L
   (3) 40.0 L
   (4) 22.5 L

9. When the pressure exerted on a confined gas at constant temperature is doubled, the volume of the gas is
   (1) halved
   (2) doubled
   (3) tripled
   (4) quartered

10. At STP, 1 liter of $H_2(g)$ and 1 liter of He(g) have the same
    (1) density
    (2) mass
    (3) number of molecules
    (4) number of atoms

11. A mixture of oxygen, nitrogen, and hydrogen gases exerts a total pressure of 74 kPa at 0°C. The partial pressure of the oxygen is 20 kPa and the partial pressure of the nitrogen is 40 kPa. What is the partial pressure of the hydrogen gas in this mixture?
    (1) 20 kPa
    (2) 14 kPa
    (3) 74 kPa
    (4) 40 kPa

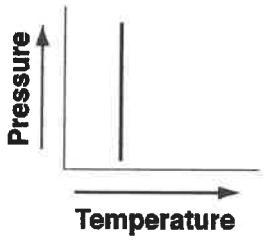
12. A gas has a pressure of 120 kPa, a temperature of 400. K, and a volume of 50.0 milliliters. What volume will the gas have at a pressure of 60 kPa and a temperature of 200. K?
    (1) 12.5 ml
    (2) 50.0 ml
    (3) 100. ml
    (4) 200. ml

13. Real gas behavior deviates from ideal gas behavior because real gas particles have
    (1) volume but no attraction for each other
    (2) volume and some attraction for each other
    (3) no volume and no attraction for each other
    (4) no volume but some attraction for each other

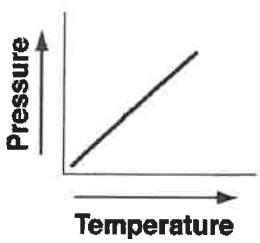
14. At constant pressure, the volume of a gas will increase when its temperature is changed from 10°C to
    (1) 283 K
    (2) 263 K
    (3) 293 K
    (4) 273 K

15. Which graph shows the pressure-temperature relationship expected for an ideal gas?

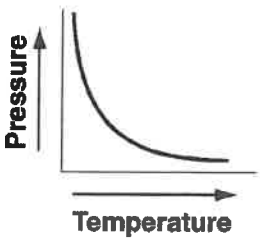
(1)



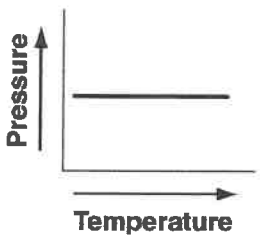
(3)



(2)



(4)

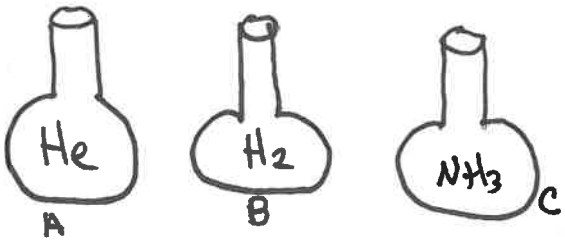


16. A 100.-milliliter sample of helium gas is placed in a sealed container of fixed volume. As the temperature of the confined gas increases from 10.°C to 30.°C, the internal pressure
    (1) decreases
    (2) increases
    (3) remains the same

17. Under the same conditions of temperature and pressure, which gas will diffuse at the *slowest* rate?
    (1) He
    (2) Ne
    (3) Ar
    (4) Rn

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

19. The diagrams below represent three 1-liter containers of gas, *A*, *B*, and *C*. Each container is at STP.



Which statement correctly compares the number of molecules in the containers?
    (1) Container *A* has the greatest number of molecules.
    (2) Container *B* has the greatest number of molecules.
    (3) Container *C* has the greatest number of molecules.
    (4) All three containers have the same number of molecules.

20. A 2.5 liter sample of gas is at STP. When the temperature is raised to 273°C and the pressure remains constant, the new volume of the gas will be
    (1) 1.25 L
    (2) 2.5 L
    (3) 5.0 L
    (4) 10. L

21. Under which conditions of temperature and pressure would gaseous molecules most likely be closest together?
    (1) low pressure and high temperature
    (2) low pressure and low temperature
    (3) high pressure and low temperature
    (4) high pressure and high temperature

22. A cylinder is filled with 2.00 moles of nitrogen, 3.00 moles of argon, and 5.00 moles of helium. If the gas mixture is at STP, what is the partial pressure of the argon?
    (1) 50.7 kPa
    (2) 101 kPa
    (3) 20.3 kPa
    (4) 30.4 kPa

23. Which of the following gases will diffuse most rapidly at STP?
    (1) O_2
    (2) N_2
    (3) He
    (4) Ne

Name: **Gas Laws**

Answer Key

1. 1
2. 2
3. 4
4. 4
5. 4
6. 3
7. 3
8. 3
9. 1
10. 3
11. 2
12. 2
13. 2
14. 3
15. 3
16. 2
17. 4
18. 3
19. 4
20. 3
21. 3
22. 4
23. 3

$3 \times 2^{\text{atm}} = V_2 \times 4\ \text{atm}$

$1/2$

Version 3