COMBINED GAS LAW WORKSHEET

Abbreviations

atm - atmosphere

mmHg - millimeters of mercury

torr - another name for mmHg

Pa - Pascal (kPa = kilo Pascal)

K - Kelvin

°C - degrees Celsius

Conversions

K = °C + 273

1 cm^3 (cubic centimeter) = 1 mL (milliliter)

1 dm^3 (cubic decimeter) = 1 L (liter) = 1000 mL

Standard Conditions:

0.00 °C = 273 K

1.00 atm = 760.0 mm Hg = 101.3 kPa = 101,325 Pa

1. A gas has a volume of 800.0 mL at minus 23.00 °C and 300.0 torr. What would the volume of the gas be at 227.0 °C and 600.0 torr of pressure?

2. 500.0 litres of a gas are prepared at 700.0 mm Hg and 200.0 °C. The gas is placed into a tank under high pressure. When the tank cools to 20.0 °C, the pressure of the gas is 30.0 atm. What is the volume of the gas?

3. What is the final volume of a 400.0 mL gas sample that is subjected to a temperature change from 22.0 °C to 30.0 °C and a pressure change from 760.0 mm Hg to 360.0 mm Hg?

4. What is the volume of gas at 2.00 atm and 200.0 K if its original volume was 300.0 L at 0.250 atm and 400.0 K.

5. At conditions of 785.0 torr of pressure and 15.0 °C temperature, a gas occupies a volume of 45.5 mL. What will be the volume of the same gas at 745.0 torr and 30.0 °C?

6. A gas occupies a volume of 34.2 mL at a temperature of 15.0 °C and a pressure of 800.0 torr. What will be the volume of this gas at standard conditions?

7. The volume of a gas originally at standard temperature and pressure was recorded as 488.8 mL. What volume would the same gas occupy when subjected to a pressure of 100.0 atm and temperature of minus 245.0 °C?

8. At a pressure of 780.0 mm Hg and 24.2 °C, a certain gas has a volume of 350.0 mL. What will be the volume of this gas under STP

9. A gas sample occupies 3.25 litres at 24.5 °C and 1825 mm Hg. Determine the temperature at which the gas will occupy 4250 mL at 1.50 atm.

10. If 10.0 litres of oxygen at STP are heated to 512 °C, what will be the new volume of gas if the pressure is also increased to 1520.0 mm of mercury?

11. What is the volume at STP of 720.0 mL of a gas collected at 20.0 °C and 3.00 atm pressure?

12. 2.00 litres of hydrogen, originally at 25.0 °C and 750.0 mm of mercury, are heated until a volume of 20.0 litres and a pressure of 3.50 atmospheres is reached. What is the new temperature?

13. A gas balloon has a volume of 106.0 litres when the temperature is 45.0 °C and the pressure is 740.0 mm of mercury. What will its volume be at 20.0 °C and 780 .0 mm of mercury pressure?

14. If the absolute temperature of a given quantity of gas is doubled and the pressure tripled, what happens to the volume of the gas?

15. 73.0 mL of nitrogen at STP is heated to 80.0 °C and the volume increase to 4.53 L. What is the new pressure?

16. 500.0 mL of a gas was collected at 20.0 °C and 720.0 mm Hg. What is its volume at STP?

17. A sample of gas occupies 50.0 L at 15.0 °C and 640.0 mm Hg pressure. What is the volume at STP?

18. A gas is heated from 263.0 K to 298.0 K and the volume is increased from 24.0 litres to 35.0 litres by moving a large piston within a cylinder. If the original pressure was 1.00 atm, what would the final pressure be?

19. The pressure of a gas is reduced from 1200.0 mm Hg to 850.0 mm Hg as the volume of its container is increased by moving a piston from 85.0 mL to 350.0 mL. What would the final temperature be if the original temperature was 90.0 °C?

20. If a gas is heated from 298.0 K to 398.0 K and the pressure is increased from 2.230 x 103 mm Hg to 4.560 x 103 mm Hg what final volume would result if the volume is allowed to change from an initial volume of 60.0 litres?