

## Chem11 Combined Gas Law : W.S. - 50

The laws of Charles, Boyle, and Gay-Lussac, can be combined into one gas law, the **Combined Gas Law** :

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

- 1) An aerosol can has a volume of 275 mL of a gas at a pressure of 5.0 atm. and a temperature of 14°C. What volume would the gas occupy at 1.0 atm and 20°C. ?
- 2) A gas occupies a volume of 12 L at a pressure 85 kPa and a temperature of 62°C. Find the volume at S.T.P..
- 3) A 550 mL balloon is filled with a gas at 120 kPa and 47°C. The balloon is removed to an area of lower pressure. The new volume is 830 mL and the temperature is 23°C. Find the new pressure.
- 4) Calculate the final temperature (in degrees Celsius) if 3.5 L of a gas at 15°C and 120 kPa is compressed to 2.2 L at 210 kPa.
- 5) What happens to the pressure of a gas if the volume is doubled and the Kelvin temperature is multiplied by a factor of six ?
- 6) A 1.8 L balloon is taken from the surface of a lake where the temperature is 21°C to a depth of 35 m where the pressure is 4.5 atm. and the temperature is 7°C. Find the new volume.
- 7) In a Diesel engine, a 1.0 L cylinder of a gas-air mixture at a temperature of 24°C and a pressure of 101.3 kPa, is compressed to a volume of 0.0714 L with temperature of 480°C. Find the pressure.

Answers : 1) 1400 mL, 2) 8.2 L, 3) 74 kPa, 4) 44°C, 5) It is tripled, 6) 0.38 L, 7) 3600 kPa.