*For each problem below, give the equation needed and show what is given (V1, T1, etc.)*

V1 / T1 = V2 / T2

V2 = V1 T2 / T1

1. Correct the following volumes of gases for the temperature changes indicated. Assume pressure is constant.

a. 8.25 L at 200. K to 150. K

b. 64.2 ml at 27.0 C to 600. K

c. 80.0 ml at 240. K to 47.0 C

d. What is the final volume of 50.0 ml of gas collected at 127 C if the temperature is changed to 27.0 C?

2. At a constant pressure, the volume of a gas increases when its temperature is changed from 10.0 C to:

(1) 263 K (2) 273 K (3) 283 K (4) 293 K

3. What volume will a gas occupy if 91.0 ml at 20.0 C and 101.3 kPa are adjusted to STP?

ANSWER KEY

V1/ T1 = V2/T2

V2 = V1(T2/T1)

REMEMBER, you must use Kelvin (K) temperatures.

1. Correct the following volumes of gases for the temperature changes indicated. Assume pressure is constant.

a. 8.25 L (V1) at 200. K (T1) to 150. K (T2)

V2 = 8.25 L x (150. K/200. K) = 6.19 L

b. 64.2 ml (V1) at 27.0 C (T1) to 600. K (T2) 27.0 C = 300. K

V2 = 64.2 ML x (600. K/300. K) = 128.4 ml = 128 ml

c. 80.0 ml (V1) at 240. K (T1) to 47.0 C (T2) 47.0 C = 240. K

V2 = 80.0 ml x (320. K/240. K) = 106.7 ml = 107 ml

d. What is the final volume (V2) of 50.0 ml (V1) of gas collected at 127 C (T1) if the temperature is changed to 27.0 C (T2)?

V1 = 50.0 ml

V2 = V1T2/T1 = (50.0 ml)(300. K)/400. K = 37.5 ml

T1 = 127 C = 400. K

T2 = 27.0 C = 300. K

V1/T1 = V2/T2

2. At a constant pressure, the volume of a gas increases when its temperature is changed from 10.0 C to:

(4) 293 K … 10 C = 283 K if V> then T> so (4) must be the answer

3. What volume (V2) will a gas occupy if 91.0 ml (V1) at 20.0 C (T1) and 101.3 kPa are adjusted to STP?

V2 = 91.0 ml x (273 K / 293 K) = 84.8 ml 20.0 C = 293 K

*STP 🡪 101.3 kPa* *& 273 K therefore, P is constant*