If 9.65 moles of an ideal gas has a pressure of 4.77 atm, and a volume of 43.85 L, what is the temperature of the sample?

Solution:

The ideal gas law is:

$$pV = nRT$$

where P is the absolute pressure of the gas, V is the volume of the gas, n is the amount of substance of gas (measured in moles), T is the absolute temperature of the gas and R is the ideal, or universal, gas constant. From this equation:

$$T = \frac{pV}{nR}$$

p (Pa) = 4.77*101 325 = 483320.25

V (m^3) = 43.85/1000 = $4.385*10^{-2}$

T (K) = $(483320.25*4.385*10^{-2})/(9.65*8.314)$ = 264.16

Answer: 264.16 K