A quantity of N2(g originally held at 3.80 atm in a 1.00L container at 26oC is transferred to a 10.0L container at 20oC. A quantity of O2(g is originally at 4.75 atm and 26oC in a 5.00L container is transferred into the same container. What is the TOTAL PRESSURE in the new container?

Solution.

Find the quantity of N_2:

$$n(N_2) = \frac{P(N_2)*V(N_2)}{R*T(N_2)} = \frac{3.8*101325*1*10^{-3}}{8.314*(273+26)} = 0.155 \text{ moles;}$$

Find the quantity of O_2:

$$n(O_2) = \frac{P(O_2)*V(O_2)}{R*T(O_2)} = \frac{4.75*101325*5*10^{-3}}{8.314*(273+26)} = 0.968 \text{ moles;}$$

Find the total quantity of gases:

$$n_{total} = n(N_2) + n(O_2) = 0.155 + 0.968 = 1.123 \text{ moles;}$$

Find the total pressure of gases in new container:

$$P_{total} = \frac{n_{total}*R*T_{total}}{V_{total}} = \frac{1.123*8.314*(273+20)}{10*10^{-3}} = 273563 \text{ pascals} = \frac{273563}{101325} = 2.7 \text{ atm.}$$

Answer: the total pressure of gases is **2.7 atm.**