Answer on Question #37997, Physics, Other

Question:

Two identical cylinders contain Helium at 2.5 atm and Argon at 1 atm respectively. If both the gases are transferred in one of the cylinders, what will be the new pressure?

Answer:

Dalton's law (also called Dalton's law of partial pressures) states that the total pressure exerted by the mixture of non-reactive gases is equal to the sum of the partial pressures of individual gases. Mathematically, the pressure of a mixture of gases can be defined as the summation:

$$P_{total} = \sum_i P_i$$

where P_i represents the partial pressure of the each component.

We have 2 components: Helium and Argon therefore:

$$P_{total} = P_{Argon} + P_{Helium} = 1\ atm + 2.5\ atm = 3.5\ atm$$

Answer: $3.5\ atm$