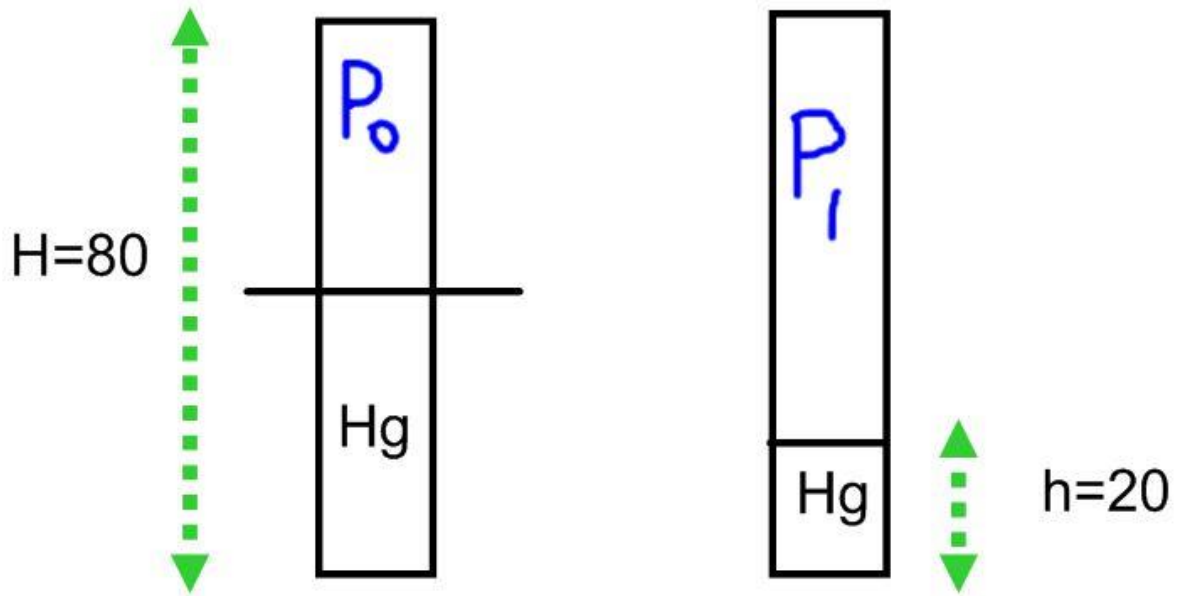1. The degree of freedom non linear triatomic gas $i_1 = 6$

The degree of freedom individual atom gas $i_2 = 3$

The result degree of freedom is $0.5 * i_1 + 0.5 * i_2 = 0.5 * 9 = 4.5$

2. Use Boyle's law

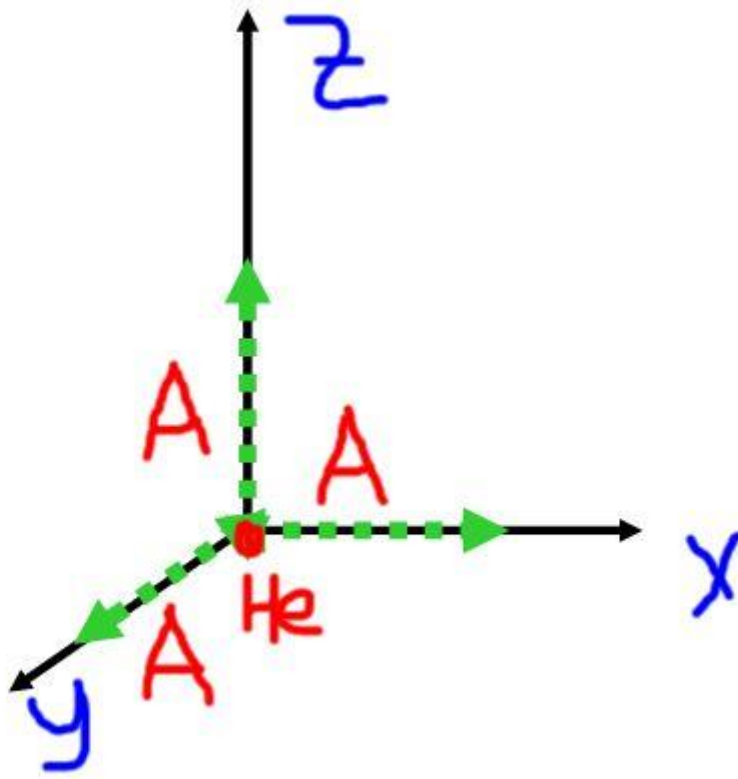$$P_0 * \frac{H}{2} * S = P_1 * (H - h) * S$$

$$P_0 * 40 = P_1 * 60$$

$$P_1 = P_0 * \frac{2}{3}$$

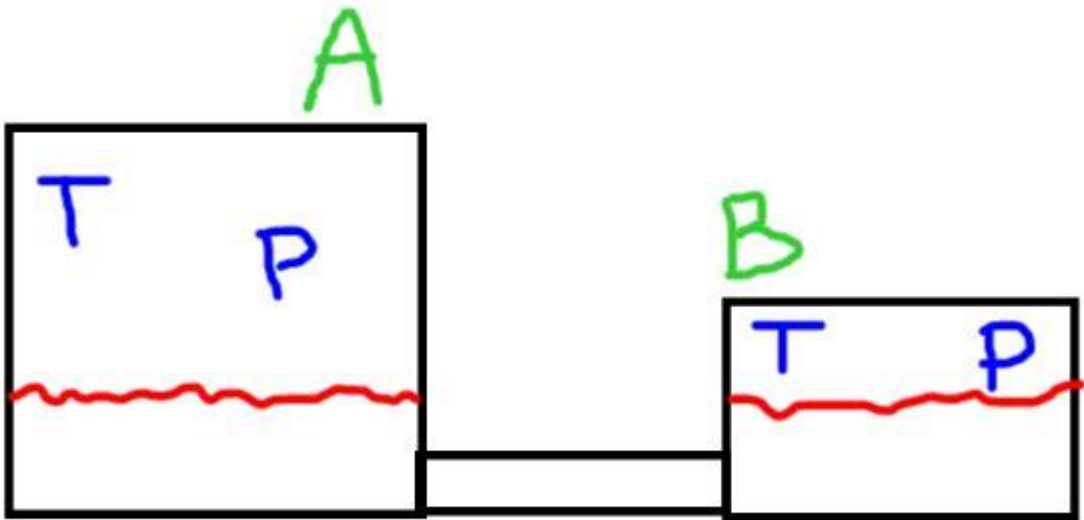Atmospheric pressure is $P_0 = 760$ mm of column of mercury

$$P_1 = 760 * \frac{2}{3} = 506 \; mm$$

3.

Its mean free path along any arbitary cordinate axis will be A

4. 1:1

A

T P

B

T P