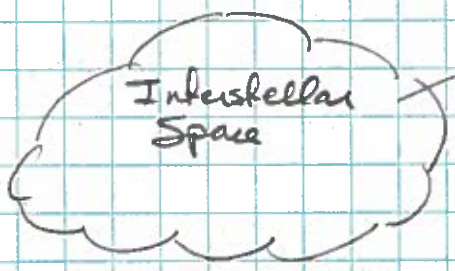


Atomic Hydrogen

$\left(\frac{N}{V}\right) = \frac{1}{cm^3}\left(\frac{100cm}{1m}\right)^3 = 1\times10^6 m^{-3}$

$T = 3K$

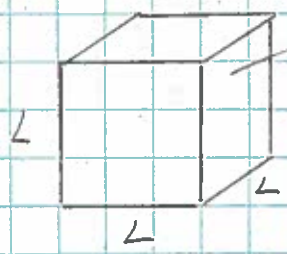
a.) $PV = Nk_BT$

$P = \left(\frac{N}{V}\right)k_BT = 4.14\times10^{-17}\ Pa = 4.087\times10^{-22}\ atm$

b.) $v_{rms} = \sqrt{\frac{3k_BT}{m}} = 272.7\ m/s$

$m = 1.0u = 1.67\times10^{-27}\ kg$

c.)



$E_{th} = 1.0\ J$

$V = L^3$

For a monatomic gas:

$E_{th} = \frac{3}{2}Nk_BT$ and $PV = Nk_BT$

So $E_{th} = \frac{3}{2}PV = \frac{3}{2}PL^3$

$\therefore\ L = \left\{\frac{2E_{th}}{3P}\right\}^{1/3} = 2.525\times10^5\ m$

where P is in Pa.