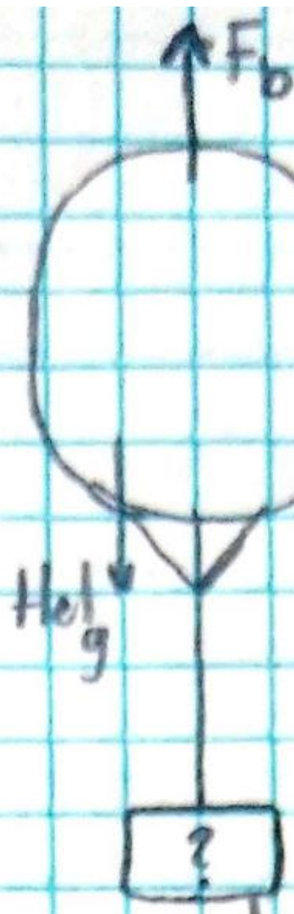
$r = 7.15\,m$

balloon mass = $930\,kg$

Helium $\rho = 0.179\,kg$

$X_M = ?$



$\sum F = MA$

$\sum = F_b - F_g$ $\quad F_b = F_g$

$\rho_{air} V g = m_{tot} g = (M_{Hel} + M_{Box} + m_{balloon}) g$

$\rho_{air} V = M_{Hel} + M_{Box} + M_{balloon}$

$\rho_{air} V = \rho_{Helium} V + M_{Box} + M_{balloon}$

$-\rho_{air} V \quad -\rho_{air} V$

$-M_{box} \qquad -M_{Box}$

$\frac{-M_{Box}}{-1} = \frac{-\rho_{air} V + \rho_{Helium} V + M_{balloon}}{-1}$

$M_{Box} = (\rho_{air} V + \rho_{Helium} V) + M_{Balloon}$

$M_{Box} = V(\rho_{air} + \rho_{Helium}) - M_{Ballon}$

$M_{Box} = \frac{4}{3}\pi 7^3 (1.29\,kg/m^3 + 0.179\,kg/m^3) - 930\,kg$

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