1) $1 atm = 101,325\ Pa$

$$\delta = \frac{1g}{cm^3}\left(\frac{1Kg}{1000g}\right)\left(\frac{100cm}{1m}\right)^3 = 1000\ kg/m^3$$

$$P = \rho g h$$

$$h = \frac{P}{\rho g} = \frac{101,325}{(1000)(9.8)} = 10.34\ m$$

2) $\rho = 2g/cm^3 = 2000\ Kg/m^3$

$P_T = 1960.1\ Pa$, $P_S = 1960\ Pa$

$$P_T = P_S + \frac{\rho V^2}{2}$$

$$V = \sqrt{\frac{2(P_T - P_S)}{\rho}} = \sqrt{\frac{2(1960.1-1960)}{2000}} = 0.01\ m/s = 10\ mm/s$$

3) $P_S = 1960\ Pa$

$$P_S = \rho g h$$

$$h = \frac{P_S}{\rho g} = \frac{1960}{(2000)(9.8)} = 0.1\ m = 100\ mm$$

4) a. R_1 and R_4 → tension, R_2 and R_3 → compression

b. R_1 and R_4 → increase, R_2 and R_3 → decrease

5) $mgh = \frac{1}{2}mv^2$

$$v = \sqrt{2gh} = \sqrt{2(9.8)(10)} = 14\ m/s$$

$$a \approx \frac{\Delta v}{\Delta t} = \frac{14}{10\times10^{-3}} = 1400\ m/s^2$$

$$a\,|_{G's} = \frac{1400}{9.8} = 142.86\ G's$$