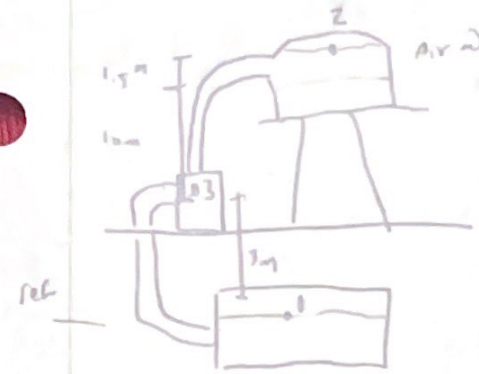

given

$S_g = .85\left(\frac{1000}{1000}\right) = 8.34 \frac{kN}{m^3}$

$Q = 840 \frac{L}{min}\left(\frac{1\ m^3}{1000\ L}\right)\left(\frac{1\ min}{60\ s}\right) = .014 \frac{m^3}{s}$

$h_{L\ 1\to 2} = 4.2\ m$

$h_{L\ 3\to 1} = 1.4\ m$

A_2

A) $h_A + \frac{P_1}{\gamma} + \frac{V_1^2}{2g} + z_1 = \frac{P_2}{\gamma} + \frac{V_2^2}{2g} + z_2 + h_L$

$P = \gamma Q h_A$

$h_A = \frac{P_2 - P_1}{\gamma} + \frac{V_2^2 - V_1^2}{2g} + z_2 - z_1 + h_L$

$h_A = \frac{P_2}{\gamma} + z_2 - z_1 + h_L$

$h_A = \frac{825\ kPa}{8.34} + 14.5m + 4.2m = 117.6\ m$

$P = (8.34)(.014)(117.6) = \boxed{13.73\ kW}$

B) $\frac{P_1}{\gamma} + \frac{V_1^2}{2g} + z_1 = \frac{P_3}{\gamma} + \frac{V_3^2}{2g} + z_3 + h_L$

$Q = V \cdot A$

$V = \frac{Q}{A}$

$0 = \frac{P_3}{8.34} + \frac{(4.53)^2}{2(9.81)} + 3m + 1.4$

$\frac{.014}{3.09 \times 10^{-3}} = 4.53 \frac{m}{s}$

$-4.14 = \frac{P_3}{8.34} + 1.0459$

$-5.19 = \frac{P_3}{8.34}$

$\boxed{P_3 = -43.3\ kPa}$