$\Delta P = ??$
$h = ??$

c) $\frac{P_1}{\omega} + z_1 + \frac{V_1^2}{2g} = \frac{P_2}{\omega} + z_2 + \frac{V_2^2}{2g} + h_{loss}$ → (1)

(h_{loss}: 1 → 2 → 0)

$z_2 - z_1 = l \sin 45 = 2 * \frac{1}{\sqrt{2}} = \sqrt{2}$ m

$Q = A_1 V_1 = A_2 V_2$

$\frac{\pi}{4} d_1^2 * V_1 = \frac{\pi}{4} d_2^2 V_2$

$(200)^2 * 2 = (100)^2 V_2$

$\therefore V_2 = 8$ m/s

sub. in (1)

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

$$P_1 - P_2 = \left(\sqrt{2} + \frac{8^2 - 2^2}{2g}\right) * \rho_{oil} g$$

$$\Delta P = 4.475 * 0.9 * 1000 * 9.8$$

$$= 39{,}473.36 \ N/m^2$$

$P_I = P_{II}$

$$P_1 + \rho_{oil} g z_1 = P_2 + \rho_{oil} g (z_2 - h) + \rho_m g h$$

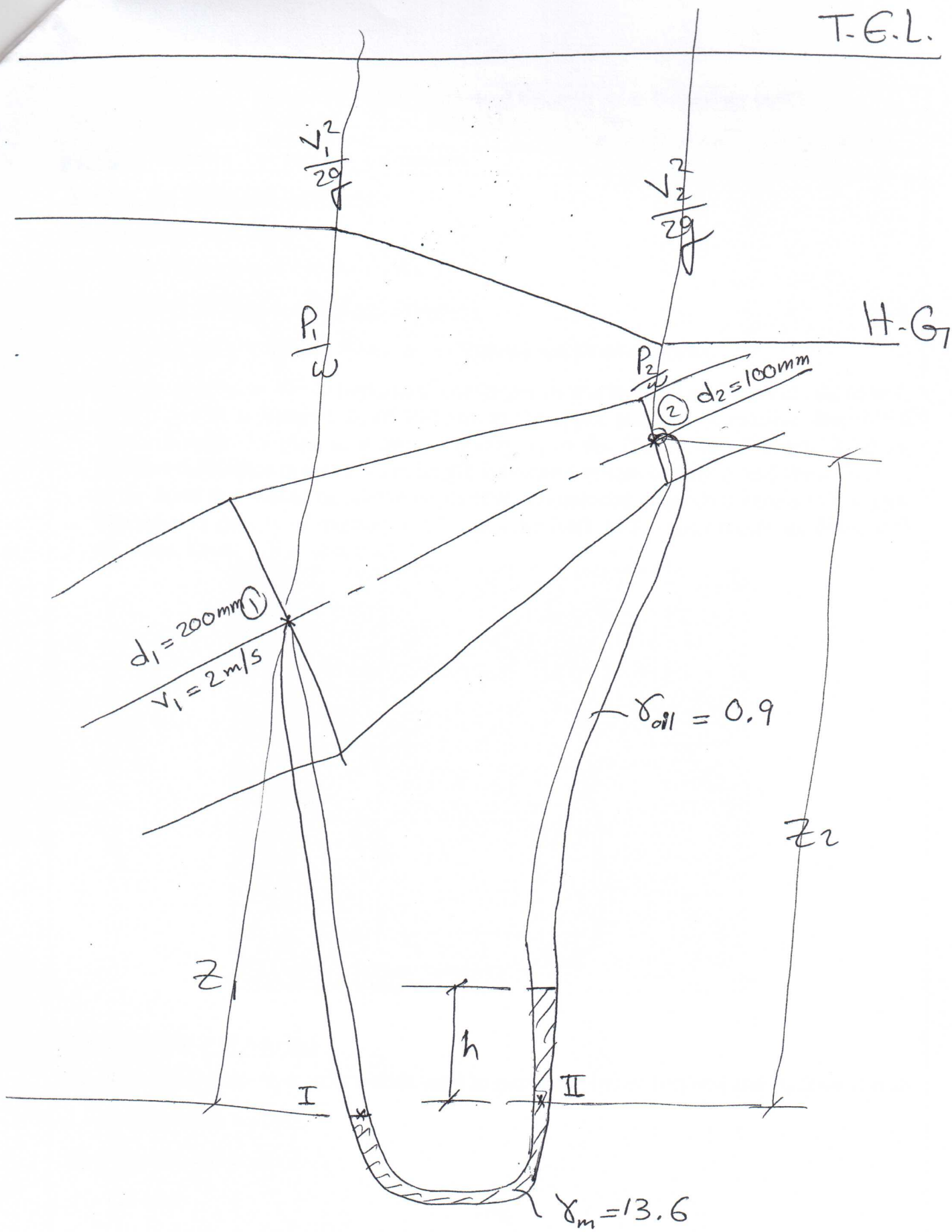
$$P_1 - P_2 = -\rho_{oil} g z_1 + \rho_{oil} g z_2 - \rho_{oil} g h + \rho_m g h$$

$$= \rho_{oil} g (z_2 - z_1) + (\rho_m - \rho_{oil}) g h$$

$$\Delta P - \rho_{oil} g (z_2 - z_1) = (\rho_m - \rho_{oil}) g h$$

$$39473.36 - 0.9 * 1000 * 9.8 * \sqrt{2} = (13.6 - 0.9) * 1000 * 9.8 * h$$

$\therefore h = 0.217$ m


T.E.L.
$\frac{V_1^2}{2g}$
$\frac{V_2^2}{2g}$
H.G.L
$\frac{P_1}{\omega}$
$\frac{P_2}{\omega}$
$d_2 = 100mm$
2
$d_1 = 200mm$
1
$V_1 = 2 m/s$
$\gamma_{oil} = 0.9$
Z_2
Z_1
h
I
II
$\gamma_m = 13.6$