



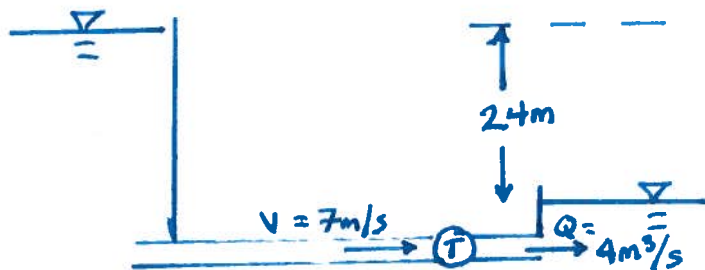
7.56

SMALL HYDRO-DAM

$$\Delta z = 24 \text{ m}$$

$$V_{\text{TURB}} = 7 \text{ m/s}$$

$$Q = 4 \text{ m}^3/\text{s}$$

FIND  $P_{\text{TURB}}$  IN K.W.EQUATION(S)ENERGY FROM RESERVOIR TO RESERVOIR, POWER =  $Q \gamma h$ 

$$\frac{P}{\rho g} + \frac{V_1^2}{2g} + z_1 = \frac{P}{\rho g} + \frac{V_2^2}{2g} + z_2 + h_L + h_T$$

$\downarrow$  0 gpe 0       $\downarrow$  0 gpe 0

HEAD LOSS IS EXPANSION LOSS ONLY (pg 271)

$$h_L = \frac{V^2}{2g} \text{ (FOR EXPANSION)}$$

SOLVE FOR  $h_T$ 

$$h_T = z_1 - z_2 - h_L$$

$$= 24 \text{ m} - \frac{(7 \text{ m/s})^2}{2(9.8 \text{ m/s}^2)} = 21.5 \text{ m}$$

POWER

$$P = Q \gamma h = (4 \text{ m}^3/\text{s})(9800 \text{ N/m}^3)(21.5 \text{ m}) = 844 \cdot 10^3 \frac{\text{N} \cdot \text{m}}{\text{s}}$$

$$= \underline{\underline{844 \text{ kW}}}$$

P