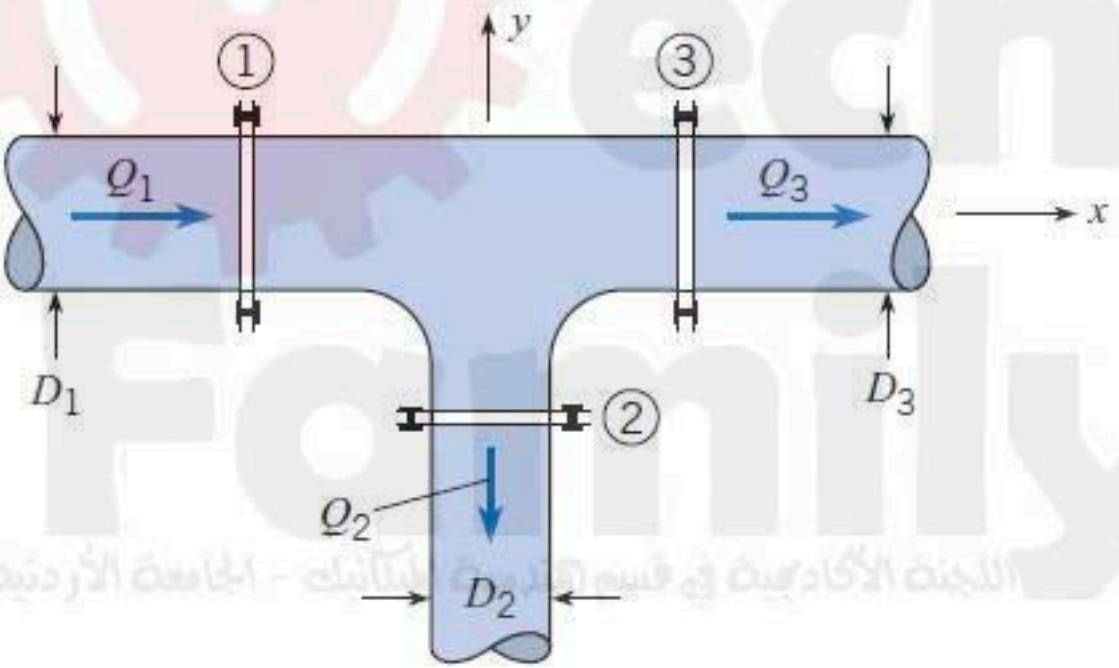
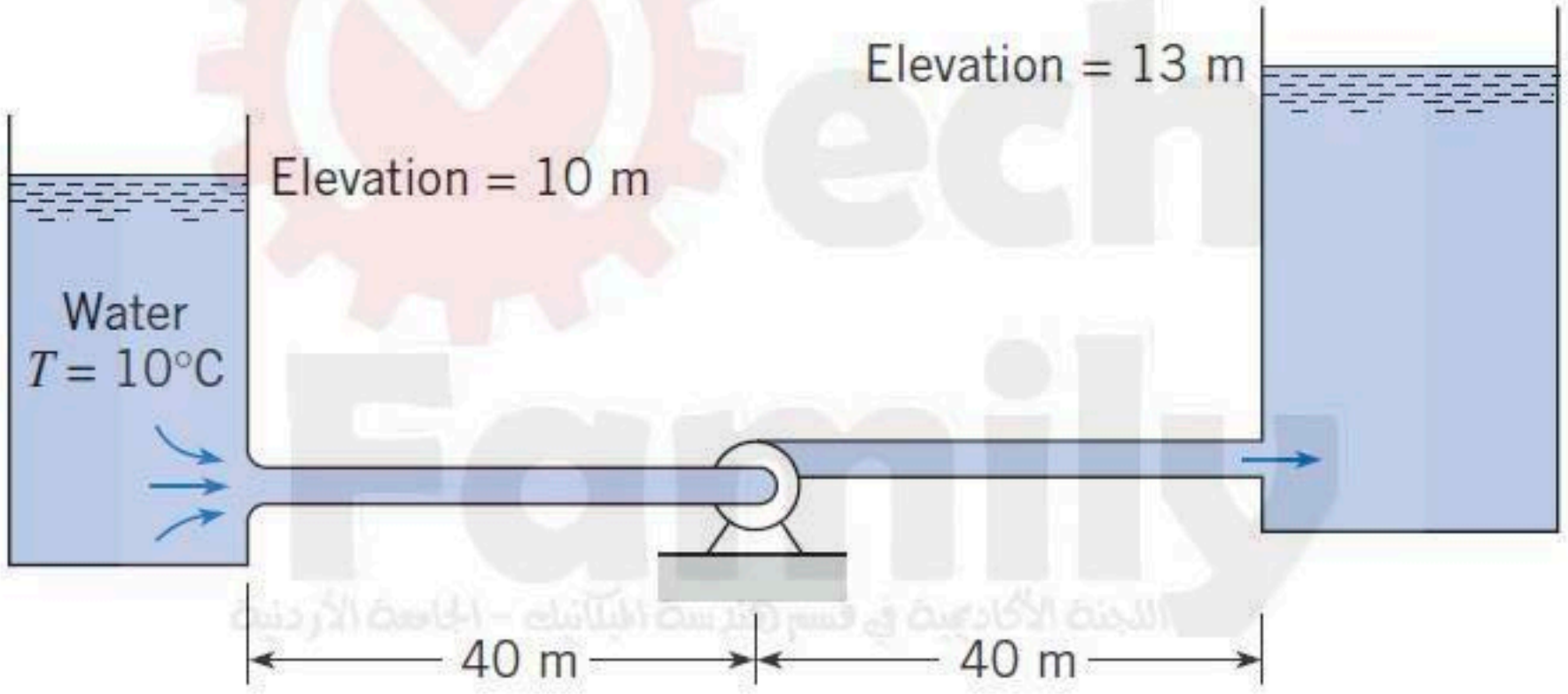
6.55 For this horizontal T through which water ($\rho = 1000\ \text{kg}/\text{m}^3$) is flowing, the following data are given: $Q_1 = 0.25\ \text{m}^3/\text{s}$, $Q_2 = 0.10\ \text{m}^3/\text{s}$, $p_1 = 100\ \text{kPa}$, $p_2 = 70\ \text{kPa}$, $p_3 = 80\ \text{kPa}$, $D_1 = 15\ \text{cm}$, $D_2 = 7\ \text{cm}$, and $D_3 = 15\ \text{cm}$. For these conditions, what external force in the x-y plane (through the bolts or other supporting devices) is needed to hold the T in place?



PROBLEM 6.55

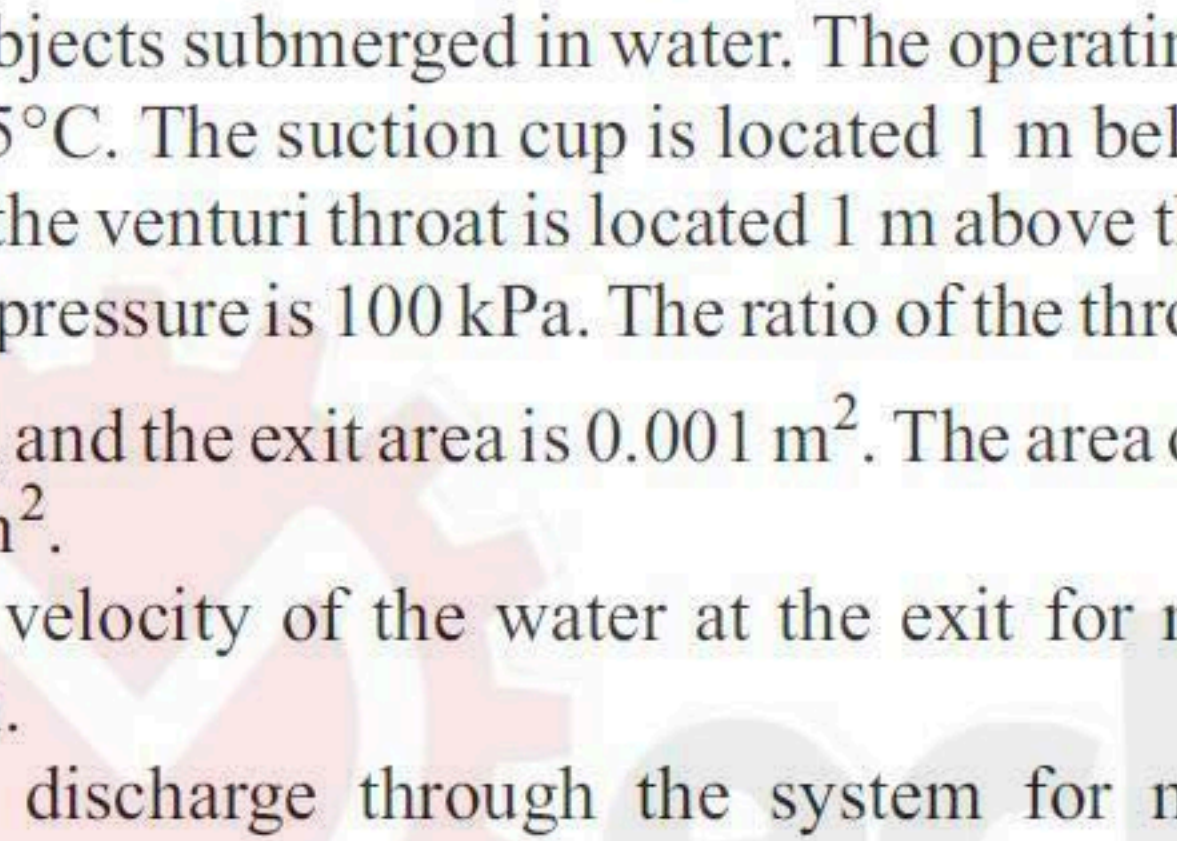
10.60 If the flow of 0.10 m^3/s of water is to be maintained in the system shown, what power must be added to the water by the pump? The pipe is made of steel and is 15 cm in diameter.



PROBLEM 10.60

5.90 A suction device is being designed based on the venturi principle to lift objects submerged in water. The operating water temperature is 15°C. The suction cup is located 1 m below the water surface, and the venturi throat is located 1 m above the water. The atmospheric pressure is 100 kPa. The ratio of the throat area to the exit area is $\frac{1}{4}$, and the exit area is 0.001 m^2. The area of the suction cup is 0.1 m^2.

a. Find the velocity of the water at the exit for maximum lift condition.
b. Find the discharge through the system for maximum lift condition.
c. Find the maximum load the suction cup can support.



PROBLEM 5.90

find Tension in the cable