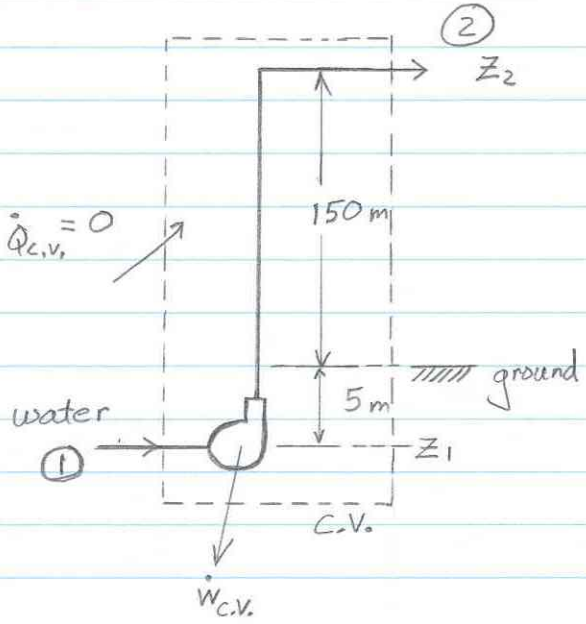
Example: Problem 6.74, Pump

- purpose: to raise the working pressure of a liquid

A water line into a tall building has a pressure of 600 kPa at 5 m below ground level. The water is pumped to deliver the water to the top floor, 150 m above the ground, at a pressure of 200 kPa.

Water $\dot{m} = 10$ kg/s at 10°C



Assumptions:

1. Steady state, steady flow
2. $\dot{Q}_{C.V.} = 0$
3. $\Delta KE = 0$ (given)
4. $U_2 = U_1$ (given)

Determine the pump work.

State 1	State 2
$P_1 = 600$ kPa	$P_2 = 200$ kPa
$T_1 = 10$ °C	$T_2 = 10$ °C
$Z_1 = -5$ m	$Z_2 = 150$ m