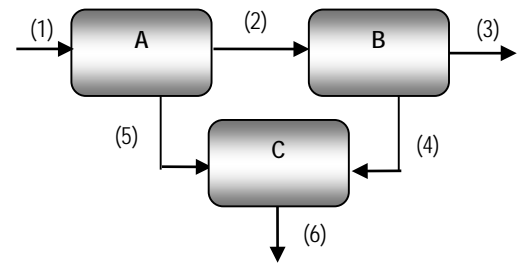

Example

A system of three tanks is connected as shown. The flow network formed by the tanks and their piping operates at **steady-state**. Known flow rates are $\dot{m}_1 = 10 \text{ kg/s}$, $\dot{m}_3 = 30 \text{ kg/s}$ and $\dot{m}_4 = 20 \text{ kg/s}$. Find the unknown flow rates.

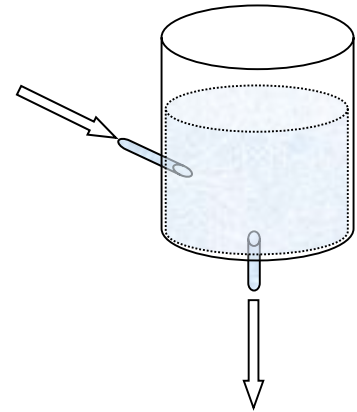


The tank system

Example

Water is being added to a storage tank at the rate of 4200 lbm/min. At the same time water flows out the bottom through a small diameter pipe at a flow rate of 4900 lbm/min. The storage tank has an inside diameter of 10 ft.

- Find the rate at which the water level rises or falls. ($\rho_{\text{water}} = 62.4$ lbm/ft³)
- If the exit flowrate is actually $1.23 \text{ lbm/ft} \sqrt{2gh}$ where h is measured in feet, find the **steady state** height.
- If the inlet flow is turned off for an initial water height of $h_{\text{int}} = 10$ ft, how long will it take to drain the tank? The exit flow is the same as given in (b).



A draining storage tank