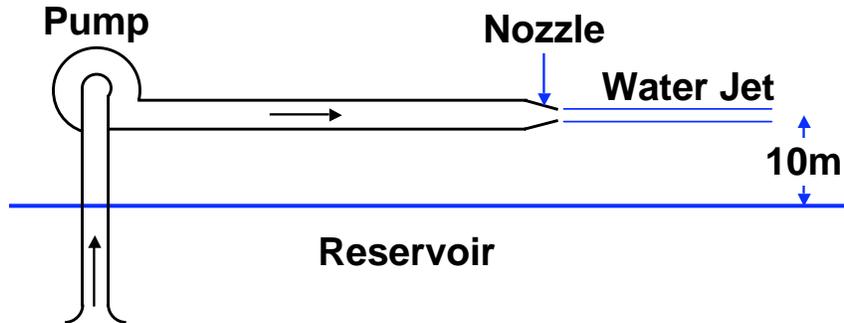


Problem 220J

A fire nozzle is to be used at an elevation of 10 m above the level of a reservoir. The velocity of the jet is to be 20 m/s and the flow is provided by a pump:



The loss coefficient between the reservoir and the inlet to the pump is 4 and the loss coefficient between the discharge from the pump and the end of the nozzle is 3. The ratio of the cross-sectional area of the jet to that of the pipes is 0.1. The inlet and discharge pipes leading to and from the pump have the same cross-sectional area.

- Find the head rise (in m) that the pump must provide.
- If the pump is 75% efficient find the power required to drive the pump in $kg\ m^2/s^3$.