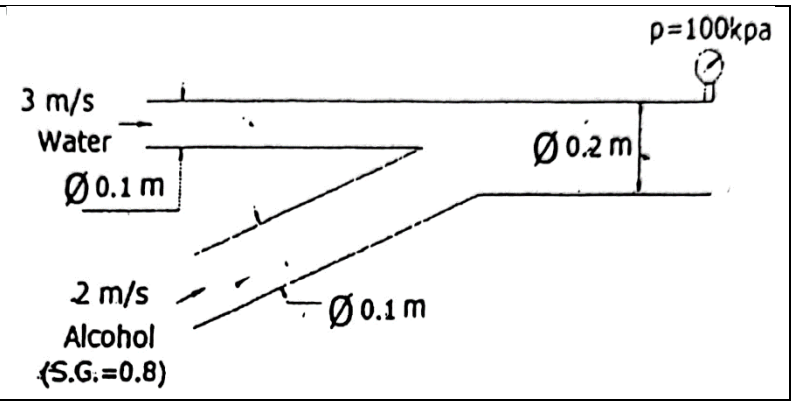
Problem (1)

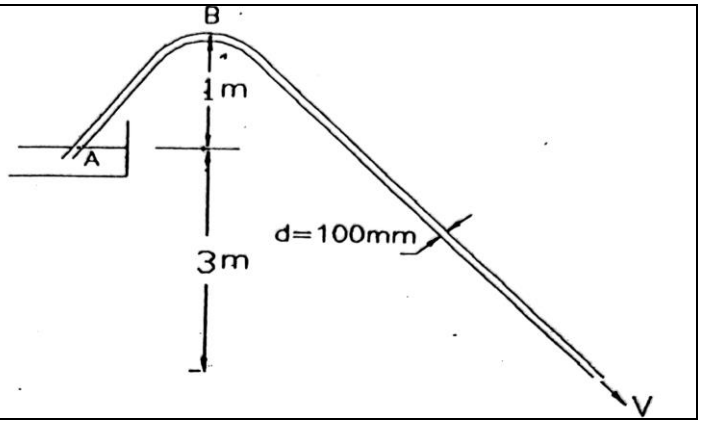
Water and alcohol are mixed in the y-duct shown in figure. What is the average density and average velocity? If the 0.2m diameter pipe tapers to 0.16m diameter and the losses encountered are $\frac{3v^2}{2g}$, where v is the velocity at pipe inlet, find the final pressure



Problem (2)

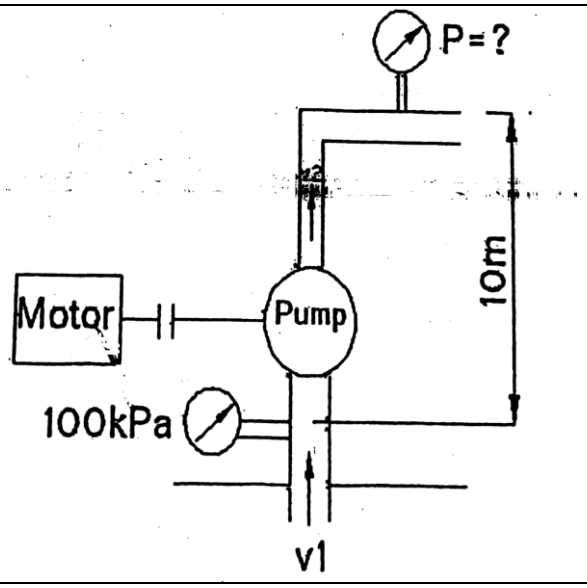
For the siphon shown in Figure. Find the volume flow rate and the pressure at A, B. Sketch the T.E.L.

[If the loss in the pipe is $\frac{3v^2}{2g}$ .Sketch the T.E.L. and H.G.L.]



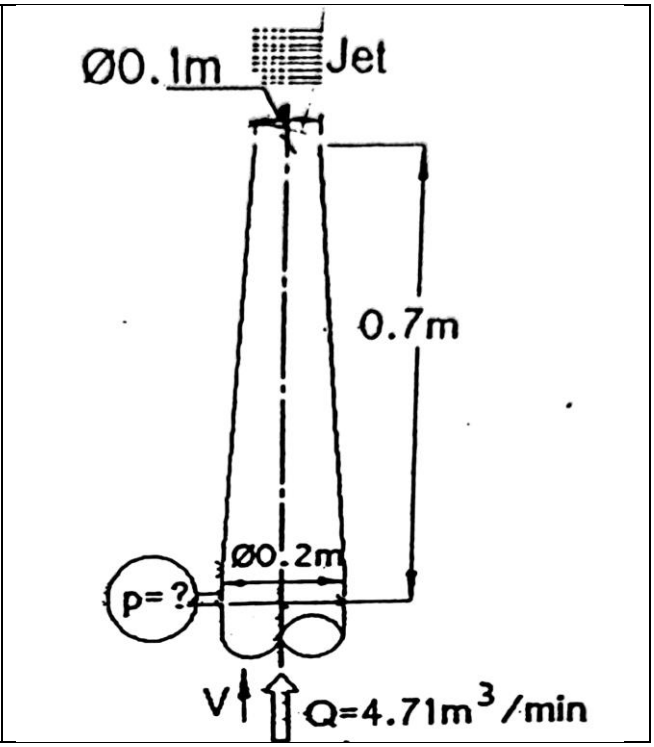
Problem (3)

The water pump shown in figure is powered by a 15KW motor with an efficiency of 90%. If the flow rate is 0.3 m^3/min, inlet pipe is 20cm diameter and outlet pipe is 15cm diameter, find the gage reading , given the pressure at inlet is 100KPa, and the loss is $\frac{3v_2^2}{2g}$



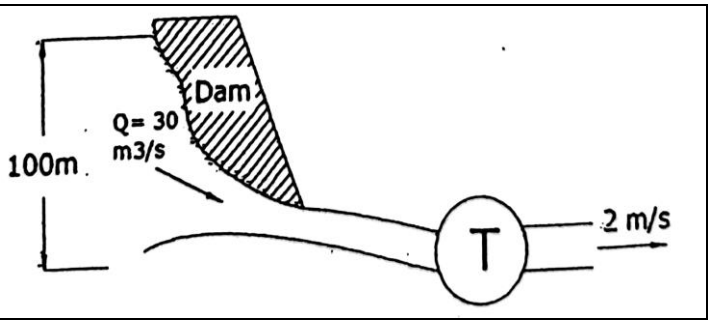
Problem (4)

Find The gage reading, p, shown in figure, when water is flowing at the rate of 4.71 m^3/min, if the losses in the nozzle are $\frac{v^2}{4g}$ and v is the inlet velocity. Find the maximum height of the jet.



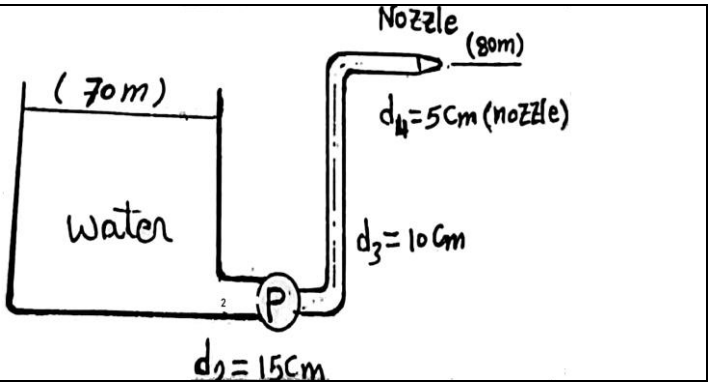
Problem (5)

A hydraulic power plant operates under the conditions shown in figure. Find the output power of the turbine, if the turbine efficiency is 95%.



Problem (6)

A pipe line with a pump leads to a nozzle as shown. Find the flow rate when the pump head is 40m assuming that the head losses are **h2**=$5v_2^2/2g$, **h3**=$12v_3^2/2g$, **h4**=$2v_4^2/2g$
then sketch the T.E.L and H.G.L.



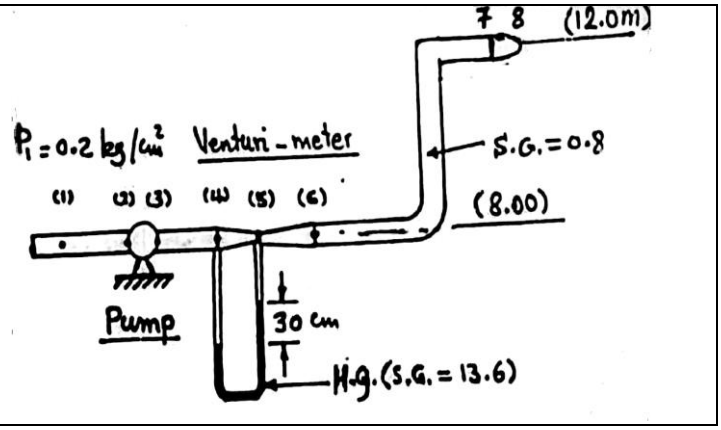
Problem (7)

For the shown pump, venture-meter and nozzle system, if $d_1 = d_2 = d_3 = d_4 = d_6 = d_7 = 20cm$, $d_5 = d_8 = 10cm$, $p_1 = 0.2$ bar,

Find: (a) The discharge in (**m^3/sec**).

(b) The pump power in (kW).

(c) Sketch the **T.E.L.** and the **H.G.L.**



Problem (8)

Sketch only the **T.E.L.** and the **H.G.L.** for the previous problem if we:

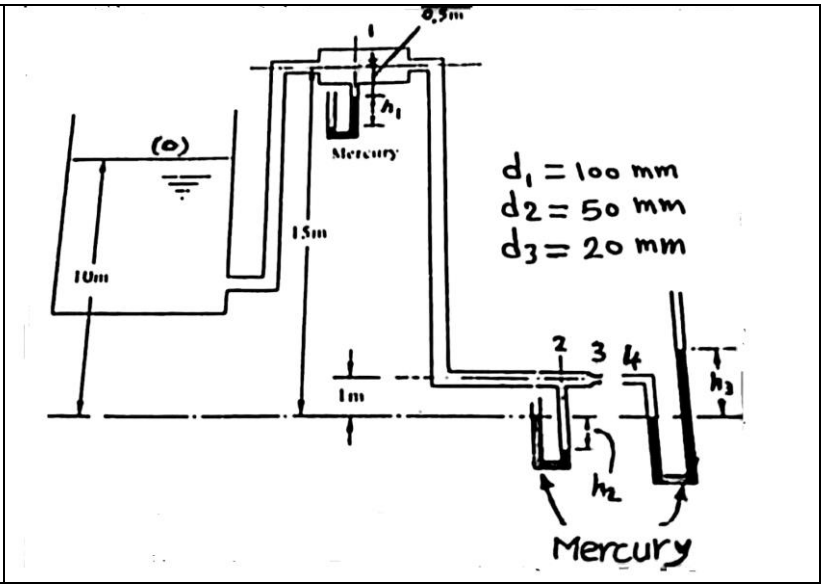
(a) Remove the nozzle.

(b) Replace the nozzle by diffuser.

(c) Remove the nozzle and bend the pipe (7-8) 90^o downward.

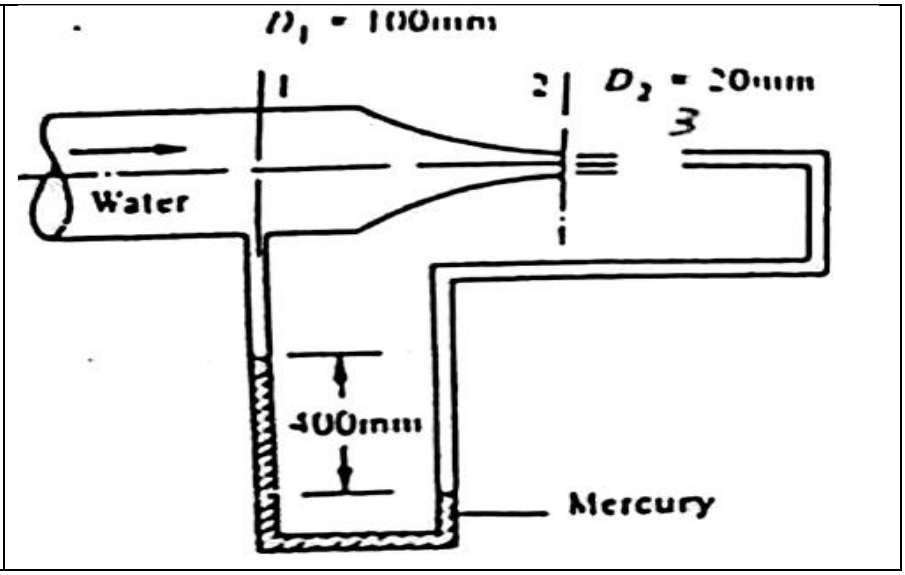
Problem (9)

If the water flows steadily through the system shown. Determine the jet velocity, the flow rate and manometric reading **h_1**, **h_2** and **h_3**.



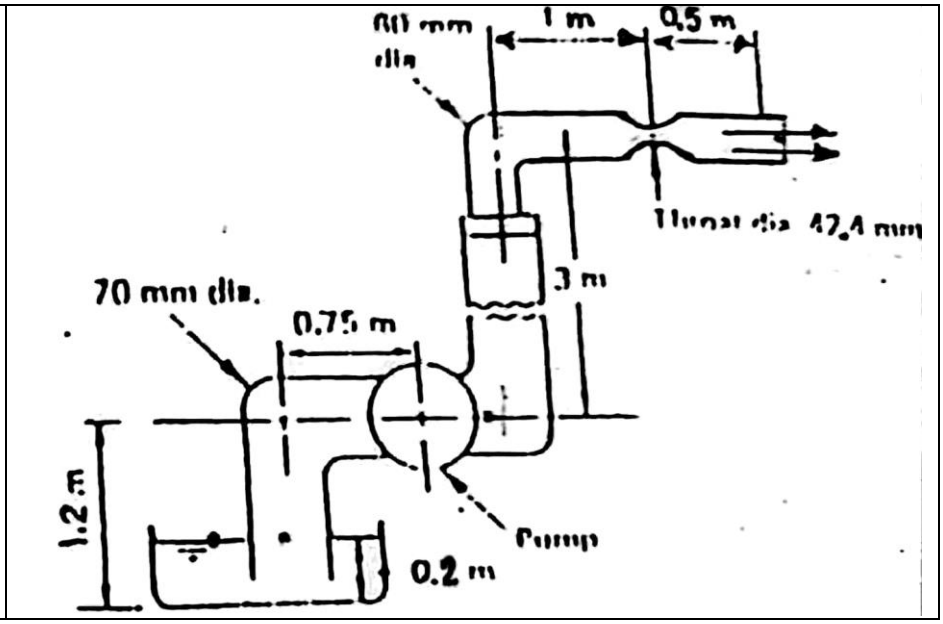
Problem (10)

Calculate the discharge, Q through the nozzle shown in figure.



Problem (11)

In the system shown, the discharge is 0.018 m^3/sec, energy loss due to friction in the suction and delivery pipes are 0.05m of water per meter length of the pipe. If the pump efficiency is 0.75, determine the power required to drive the pump and sketch the **T.E.L.** and the **H.G.L.**



Problem (12)

Drive an expression for the flow rate through Venturimeter for steady incompressible flow.