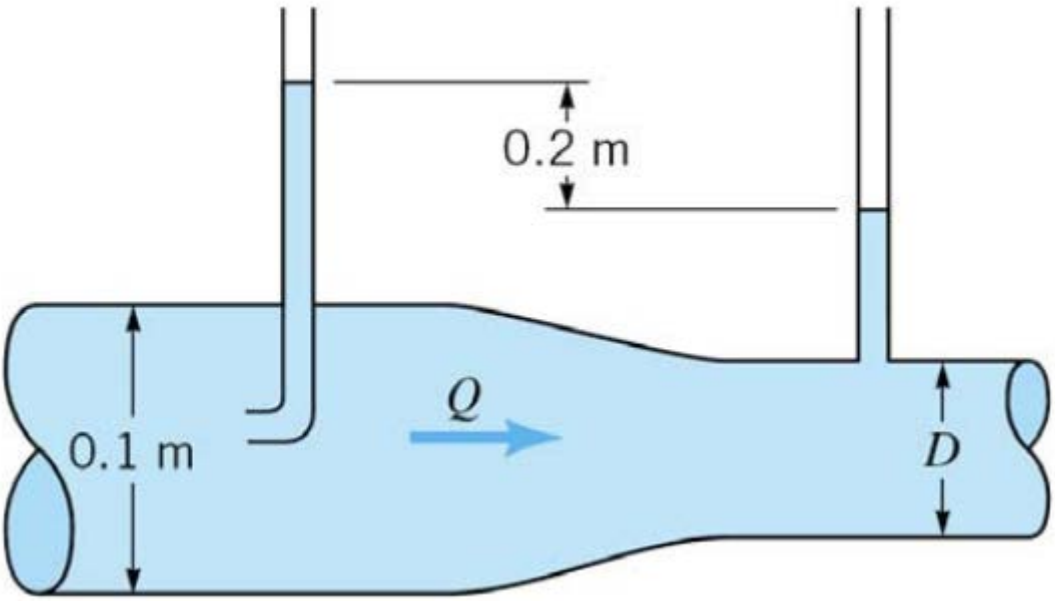
Dr. Sasha

Please, solve this problem and also show the steps to solve it.

1.07.2015 – N27

1) Water flows through the pipe contraction shown in the figure below. For the given 0.2 m difference in the manometer level, determine the flowrate as a function of the diameter of the small pipe, D.



2) The Bernoulli equation is valid for steady, inviscid, incompressible flows with constant acceleration of gravity. Consider flow on a planet where acceleration of gravity varies with height such that $g = g_0 - \alpha \cdot z$ where g_0 and α are constants. Obtain the equivalent of the Bernoulli equation for this flow.

3) Hurricane Wendy is currently centered at Galveston, TX. Windspeeds have been recorded at several nearby locations as shown in the table below.

Location	Windspeed (km/hr)
Beaumont	74.7
College Station	53.3
Houston	89.4
Texas City	215.9

Atmospheric pressure has been measured as 990 mbar at Houston (1 mbar = 100 N/m^2).

Assuming that the hurricane's wind streamlines are perfectly circular, do the following. Determine a mathematical function relating windspeed to radius from the storm center.