FPST 2483 Laboratory No 4 Name:_____

Objective:

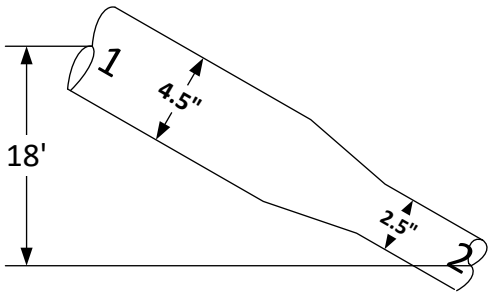
Upon completion of this laboratory session the student will be able to apply the principles of conservation of energy and conservation of matter along with Bernoulli's and other equations to the solution of water flow problems. Information from text Chapters 3 and 4 will be reinforced.

In the first part of this laboratory session, the students will be introduced to various flow measuring devices and the operation of several will be demonstrated. No written submittal is required from the students.

Procedure:

Respond as directed to the following questions. Show all of your work. Circle or enclose your answers in a box. Use nominal diameters and consider friction loss to be negligible.

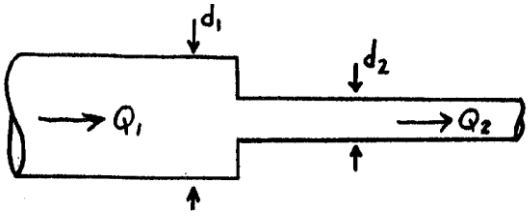
1. In the situation shown below, if the water velocity at Point 2 is 8 ft/sec find the velocity at Point 1 and the flow in GPM at Points 1 and 2.



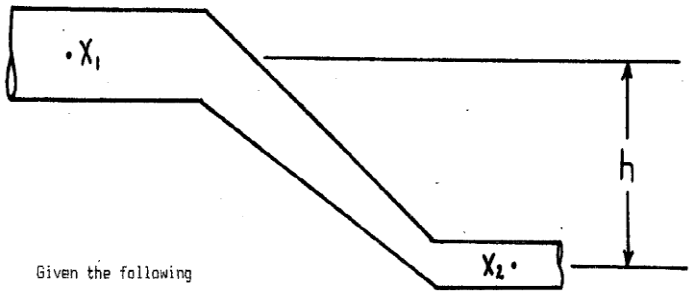
2. If $h_1 = h_2$, P_1 is 32 psi, P_2 is 24 psi and V_1 is 16 fps, use Bernoulli's equation to find V_2.

3. A. If $Q_1 = 75\ GPM$, find Q_2.

   B. Given the following: d_1=3 in ; d_2=1 in; $V_1 = 3.4$ FPS; Find V_2



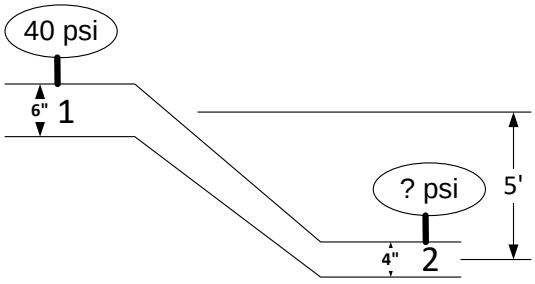
4. Solve the following problem



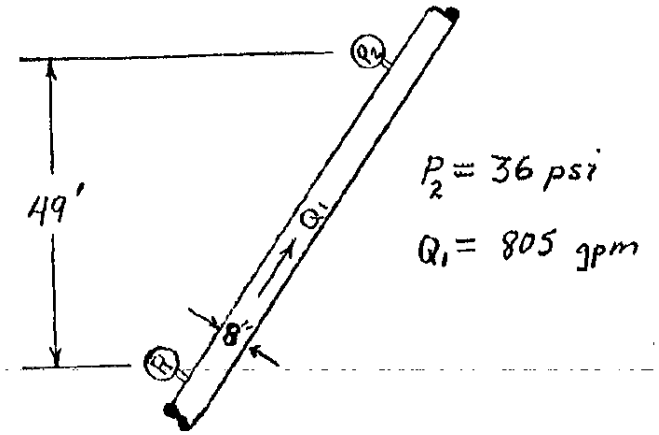
Given the following

V_1 =8 FPS
V_2 =16 FPS
P_1 =30 PSI
P_2 =35 PSI
Find h. (6 pts)

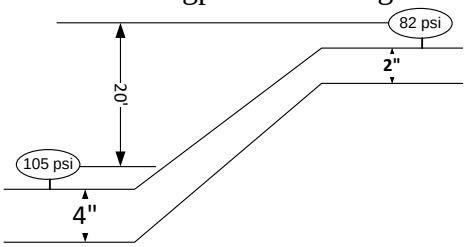
5. If 5 psi is lost to friction in the situation shown below, Gauge 1 reads 40 psi and the water velocity in the 6-inch pipe is 2 fps, what will the pressure be at Gauge 2?



6. In the situation shown below, find P_1.



7. If 120 gpm are flowing in the system shown below, how much pressure is lost to friction?



8. Determine the flow represented by the pitot pressures in the situations described below:

a. A pitot pressure of 32 psi from a 1 ½ inch nozzle with a coefficient of discharge of .98.

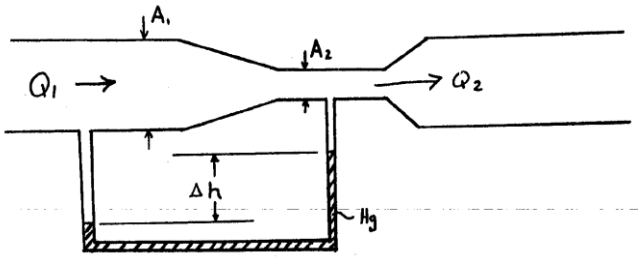
b. A pitot pressure of 61 psi from a 1 ¾ inch UL Playpipe with a coefficient of discharge of .97.

c. A pitot pressure of 22 psi from a fire hydrant with a 2 ½ inch outlet and coefficient of discharge of .80.

9. If it is desired to flow 375 gpm from a UL playpipe with a coefficient of discharge of 0.97 and a nozzle diameter of 1 ¾ inches, what pitot pressure will reflect this flow?

10. If the Venturi meter from lab is used in a 1-¼ inch pipe and has a restriction with a diameter of 0.65 inches, what flow in gpm is represented by a manometer reading of 8 inches of Mercury?

11. If the differential manometer on the 2-inch Venturi meter reads 6-inches of mercury, how much water is flowing through the 5-inch pipe. Give your answer in GPM.



12. If 620 gpm were flowing through the Venturi meter set-up in the preceding problem, how many inches of mercury would the differential manometer be reading?