Test 3 demonstrated work towards several of the course objectives outlined in the syllabus. For one, students had to explain the fluid dynamics in pipes and fittings to some degree across the assessment. We were also required to apply Bernouli's equation to fluid flow systems in problem 4. The last major course objective students worked towards was Identifying and solving different specific industrial problems. To be exact, the questions on the test involved open-channel flow, water hammer, drag and lift, forces in pipes and different instruments used for measurement.

Problem 1.

My first mistake occurred while calculating Reynolds number. I chose to calculate for just one value rather than finding it for both the top and bottom sections. This gave me one value for the drag coefficient as opposed to two different ones. This error of doing calculations for the entire body as opposed to breaking it up into the respective parts seemed to persist through my solution, and with this fact combined with my wrong values, my answer was thrown off quite a bit. Next time I will take care to pay careful attention to these things and recognize the difference splitting the body into its respective parts will have on the final answer. I would advise myself in the future to do more research on bodies that are in fact not uniform and how to calculate the forces acting on them. Additionally, I tried to factor in the weight of the material after coming up with an incorrect answer, but to factor this into my equation was wrong.

Problem 2.

I first messed up on this problem by getting the manipulation of the formula for R wrong. I believe this came as a result of me trying to put the numbers in first as opposed to just simplifying with the variables to start. From there, I chose not to iterate and instead calculated for height straight from the equation for a) a lack of time and b) a confidence in my ability that may have been misplaced. Regardless, I probably would have benefitted from iterating instead of taking the first solution that came about. In the future I will make sure to perform iterations even when I believe I have the right answer to obtain the most accurate result.

Problem 3.

For this problem I did not use the procedure Dr. Ayala outlined because I was not aware of the equation that allows us to calculate exactly for what was being asked for. Instead I chose to calculate what the manometer measures which I thought was the change in pressure (from the lab manual of the orifice plate lab). So instead of performing the full in depth calculation I calculated for Q, Reynolds number and used those along with the given information to plug into the equation for difference in pressure across the orifice plate. I should've known something was up when I found it to be over 1200ft of Hg but I just figured a lot of pressure was built up from the use of the orifice. I would advise myself to do more research and dig a little deeper into these types of problems to find and appropriate procedure as opposed to just grabbing at the closest thing that I know of.

Problem 4.

To start I did not recognize that P₃ was going to equal zero so instead of establishing that in the beginning I carried out the full calculation for that value before inputting into the equation for reaction force. Additionally I did not use Bernoulli's to solve for the different variables and instead assumed a value that might make sense for the system-it did not occur to me that I could employ Bernoulli's to this situation effectively. From there, I proceeded with the calculations with my erroneous values and limited number of equations to the final answer. I would tell myself in the future to go ahead and try to apply everything I know that could work instead of just picking a reasonable value to calculate with-this was not the problem to be doing that with.

Problem 5.

For this problem I think my biggest mistake was trying to manipulate the units of the given values to get a concise answer and in the process arriving at the wrong conclusions (units). This threw off the values I got and therefore skewed the results as well. The procedure I used was the same but my mistakes with units proved to be substantial. In the future I would advise myself to take more time to make sure I can carry out the calculations correctly and be more organized so as to not run into similar mistakes.

Problem 1			Problem 2			Problem 3	
Moment About A	1/5	Q	Equation	1/6		Correct eq	1/5
Distances	1/5		A and R	.8/6		Use R_e	1/5
Correct C_D	1.7/5		Iteration	1/6		Solving by h	1/5
Resuts	0.3/5		Critical?	.5/6		Results	.5/5
Total	4/5		Results	.5/6		Total	3.5/5
			Total	3.8/6			
Probler	n 4						
Use Bernoulli's	0/7		Problem 5				
Height with Length	1/7	(Correct C	1.7/4			
Control Volume	1/7		deltaP	.9/4		Final Grade	65.01
R_x	.8/7		Results	.8/4			
R_y	.8/7		Total	3.4/4			
Bernoulli's pt.2	0/7						
Results	.8/7						
Total	4.4/7						

For grading myself I am going to move over to excel and paste the results here.

For my final grade I have given myself a 65. I think my strengths lie in performing the actual calculations as well as representing the scenarios but I think my weaknesses are knowing the formulas as well as how and when to apply them in some cases.

While taking this test I did run into some issues with my internet connection and being able to access the files needed to complete the exam. I remedied this problem by trying to take every problem one step at a time and doing the test in sections so as to not put too much stress on my computer. While I did do the test in sections I still did it pretty much all in one day. I would've liked to have a bit more time and spread it out over a couple of days but that was not the case. I have learned several new concepts such as the forces fluids apply to components and how to calculate for the reaction forces associated with them. I have also learned a bit more about lift and drag as well as some of the instrumentation used to get our jobs done as engineers. I think engineers often use these skills and concepts to appropriately support and plan for what forces could be experienced in the designs that they produce. I am sure I'll be able to use all of these concepts in my future courses as well as maybe one day in the industry. I think I have improved on performing the calculations needed for these assessments but I still struggle a bit on being familiar with the use of all the equations needed. I believe I spent roughly 10 total hours on the test, but a fair amount of that time was spent letting my computer cool off and recuperate. Still, I would've liked to have just a little bit more time to work on it, especially considering how much time would be needed to allow my computer to run effectively.