## **Test 2 Reflection**

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MET 330

The second test shows that I am continuing to learn the concepts of Fluid Dynamics while also learning how to work through the problem at hand step by step in sections as to build on a full picture of the problem at hand. This test proved the concept of Bernoulli's equation in a fluid flow system by requiring different aspects of the equation to be solved for in different situations.

When comparing the solutions to the test to mine starting at the drawings sections our points are the same. I did not include design considerations or materials in my problem. I did include the given data and variables. You gave them for the entire problem upfront whereas I gave them at each section to help keep information right in front of me. Your test shows much more explanation for each step whereas I did this at some points and not at others. Overall, they are similar. As far as the handwritten portion of the test goes. Comparing excel files for Part A, they're laid out differently and results are different. I would say this is due to calculations on my behalf in the chart leading to graphs that I had trouble working with. My graph for part B does not resemble what you had at all. This is my error as I was running out of time after spending a lot of time trying to get the graphs in section A to work properly. For the graph in part C they a similar but also different seems to be due to how I worked the tables and set them up to graph. Moving through A our Re, Relative Roughness and friction factors were the same. You broke the hL equation into parts where I kept it as a whole system for now then broke it down. Our hA ended up being similar with a few decimals being different. For the pump power the equations look the same. You kept yours as a whole and I broke mine down. My HP was one 1HP higher than yours which I contribute to rounding throughout the problem. While written slightly different our Bernoulli's in section 3 of A came out to the same in lb/ft^2. I changed mine to kPa out of habit where you went to Psi for pressure at P3. We worked the pressure at P4 differently but again came out to the same pressure before changing units to Psi and I used kPa. Moving into part B our problem was initially setup differently but solved to be the same for the DeltaPloss. From there I did it wrong the rest of the way I also did not solve to pump power in B. I did that in A. Moving to Part C finally our initial Area is the same as is out WP followed by the hydraulic radius. Q is the same minus some rounding and the % of water pumped compared to flow of the open channel both came to 2.99%

Based on the rubric provided with the test I would give myself the following:

Writing Rubric:

- 1. 0.9/10 points for the purpose as it was identified
- 2. 1/10 points for the diagram.
- 3. 1/10 points for resources. We were not allowed to use outside sources and the only source I know that was approved to use was the book for the class.
- 4. 0/10 points for considerations. I did not give any
- 5. 1/10 points for the data and variables. All data and variables that were needed or used were labeled so that they could be read easily.
- 6. 1/10 points for procedure as I believe my procedure was done well and included more information than what was needed to solve.
- 7. 0.8/10 points for calculations as the majority were correct.
- 8. .6/10 points for the summaries as I feel I did not take the time to make them clear.
- 9. .75/10 points for materials as I didn't clearly identify but they were mentioned.
- 10. 0.7/10 points for the analysis. It could have been better, and I forgot to talk about the graph in part B.

Total 7.75/10 out of 10/10

## <u> Part 1:</u>

1.	Select pipe diameter	1/8 out of 1/8		
2.	Use Bernoulli's to get ha (ref & points in pict.)	1/8 out of 1/8		
3.	Pipe energy losses	1/8 out of 1/8		
4.	Pump power with efficiency	1/8 out of 1/8		
5.	Calculate inlet and outlet pressures	1/8 out of 1/8		
6.	Proper excel spreadsheet	.53/8 out of 1/8		
7.	Plot pump power vs. pipe diameter and inlet &	L		
	outlet pump pressures vs. pipe diameter	0/8 out of 1/8		
8.	Correct results?	.8/8 out of 8/8		
Total		6.33/8 out of 8/8		
Part 2:				
1.	Solve for dP with right equation and A1/A2	1/6 out of 1/6		
2.	C value	1/6 out of 1/6		
3.	Additional pump power	0/6 out of 1/6		
4.	Proper excel spreadsheet	.66/6 out of 1/6		
5.	plot pressure drop across the nozzle vs. nozzle	9		

diameter to pipe diameter ratio.

6. Correct results?

0/6 out of 1/6 .8/6 out of 1/6

Total

6.33/8 out of 8/8

## <u>PART 3)</u>

1.	Correct equation	1/7 out of 1/7
2.	Area calculation	1/7 out of 1/7
3.	Hydraulic radius calculation	1/7 out of 1/7
4.	% of pumped water flow	1/7 out of 1/7
5.	Proper excel spreadsheet	1/7 out of 1/7
6.	plot % of pumped water flow vs. water elev	0/7 out of 1/7
7.	Correct results?	.85/7 out of 1/7

Total

5.85/8 out of 8/8

7.75 + (80/3) \* ((7.5/10) + (6.33/8) + (5.85/8)) = 68.35 final score.

When completing the test, I ran into issues trying to create a functional excel sheets for the comparisons at the end of each section. This caused me to waste a lot of time fighting to get them correct. I must go back and work with it to see where my errors came from. Another weakness is still learning to settle into the test and take it step by step instead of focusing on everything at once while also not getting sick in the middle of the test. The steps taking to complete the test were an initial reading when the test was released on Friday. Friday night I started to work through Part A with an initial setup of the test. I broke Part A into 4 parts and worked part 1 and 2 on Friday. Saturday I finished Part A minus the excel. Sunday I built the excel and when I couldn't get the graph right I wasted several hours trying to fix it instead of continuing the test. Monday I started Part B and finished the first part of B before ending up in bed sick. I lost all of Monday after 10am and all of Tuesday. Wednesday I spent all day finishing the test and trying to fix the excels before re-writing the test to meet the rubric. The reason I wait to re-write it is to make sure I feel confident in what I am doing and not wasting time erasing and re-writing the same things over and over. I wouldn't change anything except not spending so much time on the excel portion that it strained the rest of my test for parts B and C which I believe was more detrimental to my test score than just avoiding

the excel graphs all together since I now lost points on both parts instead of just the excel part. Learning to derive pressures, fluid flow or velocity at points in a system along with losses are new concepts I learned about. The would be used when designing a fuel delivery system for combustion engines. This information could be useful later in life if I move away from electrical engineering. I don't foresee myself using this information anytime in the future. I have been able to apply what I am learning in this course to the labs course that goes with this class. I feel very comfortable with Bernoulli's equation and being able to find the information needed to use it. I need more experience with flow measurements and Open Channel Flow. I don't see this course having any intersections with my career now. I spent roughly 17 hours total on the test. I spent a lot of time second guessing myself initially and then more time trying to get the excel charts and graphs correct, Next time, I will leave the excel for last so that I can focus on the main part of the test which is the hand written portion and the writing rubrik.