Curtis Domingues Test Corrections/ Self Grading Exam 3 ePortfolio Assignment April 12, 2022

## **Self-Grading:**

## 1. <u>PROBLEM 2</u>)

1.	Reasonable assumptions (reductions, valve, tubing diam, lengths)	.75/10
2.	Apply Bernoulli twice or get 2 equations from Bernoulli	<mark>1/10</mark>
3.	Consider ALL minor losses? Handled them correctly?	<mark>1/10</mark>
4.	Handled correctly the pipe losses?	<mark>1/10</mark>
5.	Obtained 3 equations with 3 unknowns?	<mark>1/10</mark>
6.	Solved system of equations correctly (Excel?)?	<mark>3/10</mark>
7.	Final results	<mark>1/10</mark>
	TOTAL	<mark>8.75/10</mark>

FINAL GRADE:

 $(90)^{*}(8.75/10) = 78.75\%$ 

## **Test Reflection:**

I feel this test was an excellent demonstration of three core course objectives within fluid mechanics. Bernoulli's, friction loss, and parallel pipe systems. It also displays my drastic improvement in using excel, most notably using it to perform lengthy iterations. This test taught me many things and undeniably served as a essential learning experience for both my academic and professional career.

Compared to the solution provided, I find my submitted exam to be very satisfactory, with only one major mistake. Most notably, I did not account for the presence of reducers within the system. However, aware of this, I did provide multiple notes throughout my work to emphasize that I assumed the reductions were negligible (as they were not present6 within the problem diagram). I also addressed that adding the reducers would slightly reduce my increased flow rate. Given that I noted and accounted for the absence of the reducers, I believe my solution is justified as presented. Other than the one mistake, I was successful in determining both delta P and Q1 and its associated terms. Therefore, I feel confident in the work I presented and believe it to be worth the grade appraised above. Thus the strengths of my test are found in part 1 and the excel sheet of part 2, whereas the weakness is found in the mistake mentioned. In the future, I will account for ALL losses and provide an answer more suitable for real world application.

The only issues I encountered during the test were a few misunderstandings about the diagram provided. As mentioned, I was unsure whether to incorporate reductions into my calculations as they were not provided in the problem statement. I was also slightly confused about the pipe dimensions (length). However, I made my assumptions based on the best of my knowledge and ran with them. Given the procedure I stated in my write up, I believe I followed my intended method of solving perfectly.

In terms of new concepts, this test taught me a lot about parallel pipe systems. Although I worked practice problems prior to taking the exam, this test forced me to master that concept and most notable how to effectively use excel to do so efficiently. I began the test by choosing my problem, then studying it to obtain a full understanding of the system at hand. Next, I solved for delta P for part 1 which was relatively straight forward. Then I moved to part 2 which was much more complex, so I tried my best shot at creating an excel sheet to work through it. My first attempt at the excel sheet proved unproductive, so I started over and reorganized my sheet to make the massive equations easier to manipulate. Once I got the sheet reorganized, I tried to run my calculations but once again hit a barrier. After hours of looking through my sheet I found multiple errors skewing my results. By performing some calculations by hand, I had a rough idea of what my values should be, so I continued to search for errors until my results began to make sense. Finally, I worked out the kinks of my excel sheet and all my solutions were obtained. If I could redo the test, it would go much faster as I have learned what mistakes I usually make when using excel, so I would be able to prevent them or catch them much faster.

I know this test will benefit my career as engineers constantly use excel and similar software to perform massive calculations. More specifically, as I intend to design pump and piping systems, this test was an excellent practice for my future career. For these reasons, I know what I learned will be of great use to me and I'm grateful for having a test that is so personally useful to me. This test also taught me skills that have enhanced my performance in some of my other courses, as it has taught me how to use excel to my advantage.

All in all, I spent about fifteen total hours completing this test. Spread over the course of multiple days, the steps previously mentioned were used to navigate and complete my exam.