1) How and why the test demonstrates your work toward one, or more, of the course learning objectives. Be specific on the course objectives you decide to mention.

- Apply the principles of conservation of energy (Bernoulli's equation) and mass to fluid flow systems;

In the second problem, we are witnessing a flowing system. At each point (filter, valves, pump, etc) we have to use equations to calculate losses due to each interfering object. To obtain anything else (pressure being the particular request), we have to use Bernoulli's in tandem with the calculated losses to obtain pressure at the inlet.

- Compute and select the appropriate pump for different pipe system configurations.

For the same system in problem 2, we have to use Bernoulli's to get the pump head. This is done by finding losses from one major starting point (either the bottom left tank or the top right one) through to the other side of the pump. Then using the pump head, you can calculate the necessary power to decide upon how powerful a pump is required to output the provided specs.

2) How your test compares against the available solution. State the mistakes you made and what you will do next time to avoid making same mistakes. Please point out exactly where you made the mistake, say why you made the mistake, and how you should have done it. If you were taking this test again, what advice would you give yourself to ensure that you had a successful test?

In Problem 2, I did not know there were losses at the exit and entrance of a system. Since I did not factor these losses in, that cascaded through my problem. That said, it is difficult to compare my results against the test, as I ran the problem with non-SI Units. I can see the pump head obtained by Dr. Ayala is nearly 2x my own.

The truth is, I would have no advice to offer my past self. Advice is for things like remaining calm or studying more. You can't provide advice for what someone didn't know, and I didn't know about the exit or entrance losses. I don't fault my past self for doing her best with what she knew.

I spent 16 hours on the homework assignment due the same week of this exam's opening, and did not finish it. I put another 20 hours between working on the exam and formatting it. I had 3 1-hour meetings that week, for this course. I did more than expected to a 3-credit course, and I offer my past-self leniency.

3) What your grade should be. Base it on the writing rubric provided in the test and the correctness of your solution. What are the strengths and weaknesses of your test?

Purpose: (7/10)*0.05=0.035

I always find purposes difficult to write. Too abstract for me to grasp.

Drawings and Diagrams: (10/10)*0.1=0.1

Drawings are legible and present.

Sources: (10/10)*0.05=0.05

Not sure what counts here. Only used one source, but it is cited and reputable.

Design Considerations: (5/10)*0.1=0.05

More compressed and bullet-point style used in Dr. Ayala's solutions. Guess I know that for next time.

Data and Variables: (7/10)*0.05=0.035

Not sure if this is supposed to be updated as the problem progresses, or if it is only what is known from the problem statements and provided diagrams.

Procedure: (7/10)*0.25=0.175

Depends what defines a short paragraph. Not sure how to describe a 7-ish step problem is less than 7 sentences. Not sure who the target audience is meant to be – children? 10^{th} graders? Self? Professor? What level of detail is expected?

Calculations: (7/10)*0.14

Results for the calculations written was correct, but calculation not correct. Not sure how this counts. Made a known error that cascaded for 5 pages of work, but was instructed to leave in incorrect work.

Summary: (5/10)*0.05=0.025

Again, I struggle with abstract. Need more specific direction and questions to successfully summarize.

Materials: (7/10)*0.05=0.035

Not really sure how this goes. Professor's test solutions were more condensed than I would have anticipated.

Analysis: (7/10)*0.1=0.07

> Wasn't sure what was meant by "argumentative predictions". Don't really understand how to separate this from summary.

Cumulative: 0.715 * 100 = **71.5%**

4) Discuss the following:

a. What issues did you encounter in completing the test? How did you troubleshoot them?

Being forewarned about the necessity of understanding excel well enough to use formulas, I set up a 1:1 meeting with Dr. Ayala on Friday the 30th of September. In this, he demonstrated how to generate formulas, which was used heavily in problem 2 of the exam.

Having been unable to complete chapter 10 problems prior to the assignment, I had to skim the chapter for the exam and attempt to learn these minor losses on the fly. Luckily tables helped establish losses for the filter and valves.

Along with, in the first problem, I encountered a negative deflection for the use of mercury in the system, which I did not understand. After stewing on the meaning of this for nearly two days (and reaching out to Dr. Ayala), I came to understand that it depicted which side of the manometer bend the deflection was on and demonstrated this with diagrams on the final page of my problem 1 work.

b. What steps did you take to complete the whole test? Would you change something?

When I fumbled on one problem for too long, I switched to the other. I had a better grasp of the steps required for problem 2, so each time I hit a blockade on the first problem, I changed to problem 2. Problem 2 was much more involved, but I feel required less that I did not readily understand.

c. What new concepts have you learned?

There are minor losses at the entrance and exit of pipes.

d. Where you think engineers use those concepts (provide specific examples)?

Used to help determine the required power needed by a pump to overcome the losses.

e. Where do you think you will be using everything you learned?

Predominately, the group project.

f. Do you think what you learn is important for your professional career?

Readily, no. Long-term, anything can turn out to be useful, and having it to reflect back on is better than having to learn it anew.

g. How, when, where and why you might use this information or skill in the future?

If I do end up with a permanent position at NASA, I could end up working on anything from coolant systems to LIDAR. Ending up in any work that involves flowing fluids would entail use of the above, as all losses have to be factored in.

h. Have you been able to apply concepts you have learned in the course to what you do at work or in other courses?

No.

i. What areas did you feel you were most successful, or improved the most?

What was on the exam I could not have done a mere month ago. I knew nothing of applying bernoulli's, pipes, or even what a swing valve was. All of that is knowledge gained from this course.

j. How do you see this course's content intersecting with your field or career?

As mentioned elsewhere, my desire to work at NASA does closely intersect with hydraulic systems which function through the use of fluid mechanics. That keeps that open as a career path for me.

k. How much time did you spend on the test? How was the time organized? What would you do differently? Why?

Approximately 16 hours, not including formatting time. 8 hours on Friday the 30th, 8 hours on Saturday the 1st. Another 3 hours or so on Monday the 3rd to handling formatting. A large portion of the time devoted to problem 2 was just excel. The largest portion of time for problem 1 was coming to understand what the negative deflection for mercury meant.

I should have emailed the professor (for somewhere around the 5th time that weekend) asking what calculations were desired for the manometer sizing in problem 1. I understand how to explain them verbally, but could not really find a way to put the

numbers to paper, and feel that my work there was insufficient, even if my answers were correct.