Hunter Young

Professor Ayala

Fluid Mechanics

2/22/2022

MET330 Hunter Young Test Reflection

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.

The course objective that I believe I demonstrated most clearly in the first problem of the first exam is “Compute pressure and the forces (magnitude, location, and direction) associate with it in a stagnant fluid.” As shown in my work I understand the concept of the “Gamma H” equation, however I found myself getting incorrect figures when it came to finding the specific weight, admitly this was partly due to human error.

The course objective that I believe I demonstrated most clearly in the second problem of the first exam is “Apply the principles of conservation of energy (Bernoulli’s equation) and mass to fluid flow systems.” As demonstrated by my work, I understand the concept of Bernoulli’s principle and how to apply the formula to find the pressure heads at different points in the system. Using this principle along with Darcy’s friction loss equation, I was able to determine pump work, power draw, and pressure at inlet of the pump.

2) How your test compares against the available solution. State the mistakes you made and what you will do next time to avoid making the 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?

The first mistake I made was not taking the extra time to make the formatting more clear, although there is no real excuse for this and other mistakes, having my championship swim meet as this test was due and not asking for an extension did not work in my favor. Next time I have a test coming up I will make sure to schedule myself a full two days of free time to work on it at least a day before the test is due. The biggest mistake I made in my first solution was to not understand that the “X” distance could be directly canceled out of the equation, which led to my answers being incorrect. In my defense I did and still do understand that because they are the same substance in a stagnant state, the pressure change is uniform with elevation change, I just assumed that needed to be taken into consideration because the value needed to change as well. I would tell myself to take a little extra time to take a step back and make sure that every step of the process I followed was completely necessary/correct. I also found myself changing to SI units because of the way that the question was worded, which caused problems that could have been avoided had I done the pretest or reached out to you during the exam.

When using Bernoulli’s equation to determine the pump head, I used a different set of points than what is shown on the test solution, however I don’t think that it

necessarily means my chosen set of points is wrong. I do think that it contributed to getting the pressure at the pump inlet wrong, as it turned me away from the idea of using Bernoulli's equation to calculate the pressure, instead I assumed that I was supposed to use the "Gamma H" equation. To stop myself from making this mistake I would have told myself to either double check my calculated values with multiple equations, or I would have told myself to make sure I knew which equation worked for which situation. The other mistake I made in the second problem was neglecting to take into account all of the different places in the system that add to the loss head, but this was mostly because I assumed they could be ignored. If I had taken some more time to study beforehand, I would have known to take those into account.

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?

Based on the rubric given to us through blackboard, I would give myself a 57.3/90 in this order:

<u>WRITING RUBRIC</u>

- Purpose 0.25/10.0
- Drawings 1.0/10.0
- Sources 1.0/10.0
- Design considerations 0.5/10.0
- Data and variables 0.5/10.0
- Procedure 1.0/10.0
- Calculations 1.0/10.0
- Summary 0/10.0
- Materials 0.5/10.0
- Analysis 1.0/10.0
- TOTAL 6.75/10.0

PROBLEM 1)

- Identify all unknown dimensions in drawing 1/7 out of 1/7
- Cancel the distance with water (x) 0.5/7 out of 1/7
- Solve for the gasoline distance (y) 0.5/7 out of 1/7
- Correct excel spreadsheet 1/7 out of 1/7
- Using excel, get mercury case 1/7 out of 1/7
- Why results make sense and manometer length 0/7 out of 1/7
- Final results 0/7 out of 1/7
- TOTAL 4/7 out of 7/7

PROBLEM 2)

- Select pipe diameter using 3 m/s 1/9 out of 1/9
- Compute all energy losses 0/9 out of 1/9
- h_A and pump power 1/9 out of 1/9
- Pressure at pump inlet 0.5/9 out of 1/9
- Correct excel spreadsheet 0.5/9 out of 1/9
- Pump power for 4 other pipe sizes 1/9 out of 1/9
- Installation, operating, and total costs 1/9 out of 1/9
- What is the best pipe diameter? 0/9 out of 1/9
- Final results 1/9 out of 1/9
- TOTAL 5.5/9 out of 9/9

FINAL GRADE:

6.75 + (80/2)*(4/7+5.5/9) = 57.3/90

I think that this test shows that I am decent at using Bernoulli's equation, as well as figuring out how to use Excel. I think that this test also shows that I need practice with specific weight, am quick to second guess, and although I understand the theory behind the problem, I find problems manipulating the formula once it has been applied. I believe these are all things I can fix with more practice.

4) Discuss the following:

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

My biggest issue was finding a place to start, as at first it seemed really hard to tackle the problem head on. Your advice to compartmentalize the problems to make them easier to understand helped a lot

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

I spent a lot of time on it, and I know that it would have taken longer to make the Excel sheets if I didn't have access to multiple monitors, so I wouldn't change anything about that.

c. What new concepts have you learned?

The only new concept from the test is the idea of installation and operating cost, I didn't find it too difficult to understand

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

I think that engineers would use these concepts when meeting with members of their team that aren't engineers, so they don't need the specifics of the design, just what it's gonna cost so that they can budget

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

I hope that I get to use what I am learning in the industry soon enough

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

I know that what I am learning is absolutely going to be important for my professional career

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

I could see myself using this information in the near future when I design a personal project and want to do a spending report by the end of it

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

I have been able to use principles/concepts to help me understand more of my thermal applications class, but unfortunately I do not have a job where this skill set would be utilized

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

Personally I feel that I was more successful on problem 2, even though trying to figure out the whole system confused me, once I focused only on the part of the problem I needed to, it became a lot easier to solve the problem.

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

I see how the principles of fluid mechanics will help me in the future to design within parameters for professional projects that help my career, or they will help me to design the fun personal projects that I want to do.

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

I spent around 6 hours on the test in total, split into a 3 hour session, a 1 hour session, and one final 2 hour long session. If I were to do it differently, I would probably try to spread it out a little bit more, as well as study beforehand more so that it doesn't take quite as long. I'd prefer to start with getting a majority of it done in my first sitting that wayI know what to expect from the rest of the test, however I'd like to keep the sessions capped at an average of 1 hour so I have the advantage of looking at the questions fresh more.