

# Test 1 Reflection

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MET 330

The first test shows that I am starting to understand and be able to use the concepts we are currently learning such as forces produced stagnant water, determining the deflection in a manometer when only having the difference in pressures at the taps given. I was able to analyze the force needed to open a gate that is fully submerged with a buoy pulling upwards to open it. With that I determined the buoy was stable due to it being a solid body that was fully submerged. Those conditions make it naturally stable.

When comparing the solutions to the test to mine I notice I was not as descriptive as the professor was and he also used the stock image from the problem for his diagram on part 1 while I drew mine to show the forces. For given data he added ALL the information from the diagram while I only added what I would be using. I also missed writing out the procedure part of the exam and went right into calculations. Within the calculations there is a stark difference in how the professor wrote out what was happening vs me not writing anything out. This was something I noticed before turning in my test but chose not to go back and rewrite the test. Throughout the entire calculations I was not descriptive at all as to what I was solving or why. This could lead to confusion if someone picked up my work and tried to check it with no idea as to what I was doing. A lot of my answers I left in inches instead of converting to feet. This is not a major issue but if not careful can cause mathematical errors if the conversion is missed. I have slight errors in my calculations due to not converting the answers correctly. This led to my solutions being slightly off. I need to make sure all my solutions are converted to the same units before plugging them into another equation. I feel confident in knowing what I was doing but if I were to take it again, I would be much more descriptive as to what I was doing for each problem. I noticed that when I would walk away for a break and come back, I had to figure out what I was doing again instead of being able to read a brief description about what I was working on.

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

Writing Rubric:

1. 0.7/10 points for the purpose as it was identified but was a blanket statement instead of the actual work being done.
2. 0.7/10 points for the diagram. It could have been done much clearer with more information but the basics of what I needed were there.
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. 1/10 points for considerations. I think I did a good job covering them.

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. 0/10 points for the summaries as I completely forgot them in my tests.
8. 1/10 points for materials as I described all that were used in the problems.
9. 0.7/10 points for the analysis. It could have been better, and I forgot to talk about the graph in part B.

Total 7.1/10 out of 10/10

Part 1:

- |   |                  |
|---|------------------|
| 1. Magnitude of the hydrostatic force on the gate | 0.8/8 out of 1/8 |
| 2. Location of the hydrostatic force on the gate  | 1/8 out of 1/8   |
| 3. Solve for buoy force from moment conservation  | 0.9/8 out of 1/8 |
| 4. Using buoyancy eq to get sphere diameter       | 1/8 out of 1/8   |
| 5. Are the stability arguments correct?           | 1/8 out of 1/8   |
| 6. Proper excel spreadsheet                       | 0.2/8 out of 1/8 |
| 7. Buoy size vs. gate angle plot & smallest buoy  | 0.2/8 out of 1/8 |
| 8. Correct results?                               | 1/8 out of 8/8   |

Total 6.3/8 out of 8/8

Part 2:

- |  |                  |
|--|------------------|
| 1. Use geometrical relation                        | 1/7 out of 1/7   |
| 2. Use $\gamma \cdot h$ procedure                  | 1/7 out of 1/7   |
| 3. Proper manipulation of eqs and solve for "h"    | 1/7 out of 1/7   |
| 4. Pressure difference when no flow                | 0/7 out of 1/7   |
| 5. Proper excel spreadsheet                        | 1/7 out of 1/7   |
| 6. Mercury deflection vs. Pressure difference plot | 1/7 out of 1/7   |
| 7. Correct results?                                | 0.5/7 out of 1/7 |

Total 5.5/7 out of 7/7

$$7.1 + (80/2) * ((6.3/8) + (5.5/7)) = 70.03 \text{ final score.}$$

When completing the test, I ran into issues trying to create a functional excel sheet for the changes in angle of the gate in part A and for the pressure differences in part B. To solve these, I just playing around with different ideas and ways to make it work like I thought it should. I had a lot of issued trying to solve Part B. I could not get the problem set up correctly initially. I emailed and texted the professor to ask him for some guidance as I felt lost. He was fantastic guiding me but making me think about what was missing and why. Once that was figured out, I was able to solve the problem. To solve the test, I did rely on reviewing old problems we had done in homework and in class as well as examples in the book. I would not change the way I approached solving the problems. I have learned about the relationship between pressure and elevation. The pressure on the surface of water is 0psi and increases as you go deeper. The concept of buoyancy and how a solid body that is fully submerged is naturally stable. Engineers would use these concepts when designing submarines. They would need to be able to calculate the pressures exerted on the submarine to build the frame and body strong enough to withstand those pressures. They also need to understand the buoyancy of them. This is needed so they can calculate what it will take to make the submarine dive or surface. Based on what I have learned from this test I can not think of anywhere off the top of my head that I will use it unless I change career paths. For my career it is not important. With that said if I change careers the knowledge gained could become beneficial. I feel like I was most successful in working through part A of the test initially but once I got to part B and finally got the drawing set up correctly it was much easier to solve. I spent roughly 12 hours on the test. Most of It was just staring at it trying to figure out where to start. I had to let it marinate and remember that the professor told us that there was a lot of unneeded information in there. So, once I sorted that out, I believe I spent 4-5 hours working through the problems. Another hour re-writing them so it was clear and then the excels took what seemed like forever! I am not an excel guy, so it took me some time to get that setup and working properly. I think next time I will go at the test by skipping the first paragraph and going straight to the problem asked. This way I don't fixate on information that is not needed for that specific problem and instead figure out what information I need and find it that way.