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MET 330 Test 1 reflection

In the test taken last week, we were able to identify several objectives that are presented in our syllabus, the ones I was able to identify in the exam were:

2-Apply concepts of and compute pressure and the associated forces (magnitude, location, and direction) in a stagnant fluid, demonstrating accuracy in calculations.

3-Analyze and determine buoyancy and evaluate the stability of objects when floating or submerged in a fluid, justifying the conditions of stability.

8-Understand, identify, and calculate using different instruments to measure fluid flow quantities, such as pressure, fluid velocity, and flow rate, with precision.

The objective number 2 I saw in part B of the exam when it asked me to find the pressure that was read in the manometer, in the same part of the exam you can see the objective 8 which is to understand the use and calculate the pressure using instruments. And objective 3 we could see in part A of the exam when it was asked the diameter of the buoy, which we were just able to find by calculating the buoyancy of the buoy, the direction of the tension pulling the gate and the forces related to that problem.

When comparing my work to the solutions i was able to see some mistakes, them being:

- When calculating the F_b force of the Bouy I didn't take in consideration I had to calculate $L F_b$ and $L F_r$, so the value i got for F_b was different, and instead I made a relation with the tension and the F_b force.
- Another part I had a lot of problems with was making the excel sheet and applying the calculations i made on paper to the sheet i made, all the calculations i made there were off and without knowing how to proceed those it made it impossible to continue to make the other angles and plotting the graph.
- When looking for the pressure measured at the manometer, even though i found the correct value of h , i was overthinking and used another method to calculate the pressure and not the " $\gamma * h$ ".
- And finally the same thing that happened to part A with the excel sheet happened to the excel sheet for part B, where I had a lot of difficulties and didn't know how to start the formulas I was plotting for and when plotting the graph looked a straight line up but not the correct values.

After seeing the solutions in my opinion my grade should be:

WRITING RUBRIC

Purpose - 0.5/10

Drawings and diagrams- 1/10

Sources - 1/10

Design considerations- 0.8/10

Data and variables - 0.4/10

Procedure - 0.9/10

Calculations - 1/10

Summary - 0.4/10

Material - 0.5/10

Analysis - 0.8/10

Total - 7.3/10

PART 1

Magnitude of the hydrostatic force on the gate - 0.7/8

Location of the hydrostatic force on the gate - 0.8/8

Solve for buoy force from moment conservation - 0.6/8

Using buoyancy eq to get sphere diameter - 0.7/8

Are the stability arguments correct? - 1/8

Proper excel spreadsheet - 0.3/8

Buoy size vs. gate angle plot & smallest buoy -0/8

Correct results? - 0.6/8

PART 2)

Use geometrical relation - 0.9/7

Use $\gamma \cdot h$ procedure - 0.7/7

Proper manipulation of eqs and solve for "h" - 1/7

Pressure difference when no flow - 0.2/7

Proper excel spreadsheet - 0.6/7

Mercury deflection vs. Pressure difference plot - 0.8/7

Correct results? - 0.6/7

FINAL GRADE:

$$7.3 + (80/2) \cdot (4.7/8 + 4.8/7) = 58.229$$

After the exam and seeing my thought process during my procedure the point i struggled the most was the analysis and being able to read the problem and apply what we learned, overthink everything. The main thing i would've done differently was to spread the steps throughout more day so my brain would have more time to breath in between steps, specially with the day I planned to started the exam I had some family issues back home and that also affected a lot of my focus to think and analyze the problems. The main things I got from this exam was to calculate buoyancy and to see the forces in the gate, and calculate the height in the u-tube as well. The main thing I think engineers would use this concept is water distribution to send water through tubes, those might be used in the near future in my internship at the water and wastewater company of Baltimore city, seeing and understanding more of the entire process. Even though this is important right now for my internship, the area I want to work in I don't envision myself using these concepts a lot, maybe to a cooling process or a distribution of a fluid in a production cycle, but I can be wrong and knowing this can help me a lot in the future. I haven't had the opportunity to use any of the concepts but I am sure this class is preparing me for it in case I need it. Even Though i still struggle a lot with the analysis, I think that skill is improving slowly throughout not only this class but also the thermo from last semester.

As mentioned before, I would've started the exam earlier, and not on the second to last day, my organization was based on spending the entirety of those two days just to get the exam done when I should've divided them into more days and with breaks in between.