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MET 330

Test 1 Reflection

10/12/2021

Test #1 Reflection

In test number one we had many of the different course objectives covered with just one system. This system touches the use of: describing the nature of fluids and defining different fluid properties with Ethyl Alcohol and Hg, computing pressure and forces associated witch a stagnant fluid (when flow stopped), explaining the fluid dynamics in pipes and fitting (multiple different fittings throughout), applying Bernoulli's equation to a system, and computing friction losses in pipes for different configurations.

My test is very close to the solution that was posted in blackboard. Throughout the first part of: getting the velocities, energy losses, and pressure in the tank on the right, my solutions line up within rounding of the answers that were on the solution. When it comes to solving the manometer part of the problem where I made my first mistake. When solving for *h* in the manometer I did not consider that the pressure in the elbow would be different than the pressure in the tank. I should have added another point to my drawing making point 3 in the elbow and used that pressure to solve for the *h* in the manometer. Again, on the second part for when the fluid is stagnant, I calculated my pressure within rounding to the solution of the calculated pressure. I also did not consider in this section that the pressure in the elbow would be different than the pressure in the tank on the left, so my *h* value does not match what was found in the solution. In the third part I created my excel file and ran values from 0 gpm to 350 gpm and found the solution to be around 210 gpm to get 75 psi in the tank on the right. This is close to what was in the solution, and I assume that it can be due to the rounding of the numbers in my excel sheet. Overall, I think my test matched up the solution well minus missing the fact that the pressure would be different in the elbow.

Writing Rubric:

1. Purpose: .5/10
    a. In this section I stated clearly what the objective of the problem and the given numbers for the problem.
2. Drawings: 1.0/10.0
    a. In this section I clearly draw out the system needed for the problem and label all measurements and needed values. I add points in correct spots to solve the problem and put my reference in a reasonable position.
3. Sources: 1.0/10.0
    a. I placed the only source that was used which was the book.
4. Design Considerations: 1.0/10.0
    a. I used more design considerations that what were place on the solution but I feel that they also apply.
5. Data & Variables: 0.5/10.0

    a. I clearly stated all of the given variables and found variables in this section in an organized manner.
6. Procedure: 2.0/10.0
    a. I described the procedure that was needed to solve the problem in clear concise steps that can be easily followed.
7. Calculations: 1.5/10.0
    a. For the calculations I show the work neatly and in an organized manner. The majority of my calculations match what was given in the solution minus not solving for the pressure in the elbow.
8. Summary: 0.5/10.0
    a. I thoroughly describe the design of the system and the way in which it works according to the calculations.
9. Materials: 0.5/10.0
    a. I stated all of the different materials that were used in the solving of the problem.
10. Analysis: 1.0/10.0
    a. In my analysis I discuss my findings and how the system worked according to the problem, and what could happen if the psi dropped below 45.446 psi.

Total : 9.5/10

Part 1:

a. Bernoulli's at liquid surfaces and solve for air pressure: 1/7
b. Compute velocity with Q=VA : 1/7
c. Compute energy losses (pipe and minor): 1/7
d. "gamma*h" equation and solve for "h" in manometer: 1/7
e. Compute pressure at 2nd elbow: 0/7
f. Create spreadsheet with all calculations: 1/7
g. Correct results?: .5/7

Total : 5.5/7

Part 2:

a. "gamma*h" equation and solve for air pressure: 1/3
b. "gamma*h" equation and solve for "h" in manometer: 1/3
c. Correct results?: .5/3

Total : 2.5/3

Part 3:

a. Use spreadsheet from "1st part" to get P1 for diff Q

Make sure energy losses change when changing Q: 1/4

b. Plot P1 vs Q: 1/4
c. Read Q for P1=75 psig: 1/4
d. Correct results?: 1/4

Total: 4/4

Overall Total: 10+(80/3)(5.5/7+2.5/3+4/4) = 79.84

During the test I did not encounter many issues. Mainly if I came to a part where I didn't know exactly which next step to take I would refer back to the book for guidance. If I could retake the test I would take more time looking at the drawing and understanding where the pressures would be different and where things are connected. From this test I have taken the knowledge of solving for pressures between tanks when fluid is flowing and also when the fluid is stagnant and how they both relate to a manometer being attached to the two. I have also learned that I really enjoy fluid mechanics and the applications it has to real life scenarios. I think engineers use these concepts every day whether it be in a manufacturing sense or on the larger scale on designing how water can be supplied to everyone throughout a city. I believe that what I am learning in this class is a great step in my professional career and can be applied to many different applications in my current field of mechanical engineering. I could use what was on the test in my everyday life calculating hydraulic pressures, and other fluid pressure in our equipment. I have not yet applied what I have learned in this course but I do see where it will be very beneficial it helping design systems in the future. I feel that my strong suit is Bernoulli's equation and the application of it throughout different systems. This courses content will relate directly to my career going forward. I spent around 3 hours to complete this test between the pre-test and the actual test itself. I feel I was very organized and walked through the process as I should have.