

Fluid Mechanics Test 1 Reflection

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1) This test demonstrated my work toward describing the nature of fluids and define different fluid properties such as viscosity and pressure by me finding the pressure at different points in a system and finding the heights of a manometer using pressure. These also demonstrated my work applying the principles of conservation of energy (Bernoulli's equation). It demonstrated my work in explaining fluid dynamics in pipes and in computing friction losses in pipes for elbows, valves, and openings because the first problem on the test had oil flowing through pipes. This test also demonstrated my work in computing pressure and forces associated with a stagnant fluid because the second problem had stagnant fluid.

2) One of my biggest mistakes was in incorrectly sizing the pipe diameter. I had forgotten that the true inner diameter of the pipe was different from the diameter given in the problem and that it needed to be looked up in the tables at the back of the book. Next time I will be more conscientious about measurements. The other thing I messed up was in finding the energy losses in the pipe. I had everything set up properly with the correct equations, but I incorrectly found the friction factor. I just divided roughness by the diameter instead of using the Moody chart to find the proper friction factor. In the future I will use the Moody chart to find the friction factor.

3) Purpose	0.5/10.0 out of 0.5/10.0
1. Drawings	1.0/10.0 out of 1.0/10.0
2. Sources	1.0/10.0 out of 1.0/10.0
3. Design considerations	1.0/10.0 out of 1.0/10.0
4. Data and variables	0/10.0 out of 0.5/10.0
5. Procedure	2.0/10.0 out of 2.0/10.0
6. Calculations	1.0/10.0 out of 2.0/10.0
7. Summary	0.5/10.0 out of 0.5/10.0
8. Materials	0.5/10.0 out of 0.5/10.0
9. Analysis	1.0/10.0 out of 1.0/10.0
TOTAL	8.5/10.0 out of 10.0/10.0

1st part)

1. Bernoulli's at liquid surfaces and solve for air pressure	1/7 out of 1/7
2. Compute velocity with $Q=VA$	1/7 out of 1/7
3. Compute energy losses (pipe and minor)	0.5/7 out of 1/7
4. " γh " equation and solve for " h " in manometer	1/7 out of 1/7
5. Compute pressure at 2 nd elbow	1/7 out of 1/7
6. Create spreadsheet with all calculations	1/7 out of 1/7
7. Correct results?	0/7 out of 1/7

2nd part)

1. " γh " equation and solve for air pressure	1/3 out of 1/3
2. " γh " equation and solve for " h " in manometer	1/3 out of 1/3
3. Correct results?	1/3 out of 1/3

3rd part)

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|---|----------------|
| 1. Use spreadsheet from "1 st part" to get P1 for diff Q
Make sure energy losses change when changing Q | 1/4 out of 1/4 |
| 2. Plot P1 vs Q | 1/4 out of 1/4 |
| 3. Read Q for P1=75 psig | 1/4 out of 1/4 |
| 4. Correct results? | 0/4 out of 1/4 |

$$8.5 + (80/3) * (5.5/7 + 3/3 + 3/4) = 76.12$$

I had everything set up properly, I just used incorrect diameter and friction factor values. My strengths were sketching, getting the proper equations, and calculating the equations. My weaknesses were in finding the proper values to put into the equations.

4) Discuss the following:

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

I first ran into an issue of time while completing the pretest, and that showed me that I would have to invest a lot more time into the test than I was originally planning to do. I allotted myself more time to finish it before the due date so I could check over it again on the day it was due.

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

I leaned heavily into completed practice problems to complete the test. At first, I just tried to use the equations I had learned from the class, but it didn't work out very well for me. I will look more in depth into the practice problems posted on canvas throughout the class before starting the test.

c. What new concepts have you learned?

I have learned a lot about pipe losses and about using Bernoulli's equation to find pressures. I have also learned about manometers and how to read them. I also learned a lot more about using excel as a calculator.

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

I think engineers use these concepts in pressure apparatuses for pipe systems. This might be used for plumbing systems or water towers.

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

I think I will be using this to design pipe systems to transport water through buildings. I will also be using it later on in the semester to complete the project to teach fluid mechanics and engineering design to children.

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

I do think what I am learning is important for my professional career because it teaches me the best way to tackle new problems by sketching it and trying to assess what is going on in the problem instead of trying to find specific things.

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

I might use this information if I am working in a job where I am designing pressurized systems with pipes.

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 first learned this method of problem solving in thermal applications, so I have used this method in that class, and I have used it in my physics classes.

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

I felt that I was most successful at assembling the problem with all the proper sketches and formulas. I was not as good at finding the values I needed to put into the formulas to solve the problem.

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

I have the potential to work with reactors in the Navy and they have cooling systems with pressurized pipes which would use these equations.

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

I spent roughly seven hours on the test. I knew I would not be able to work on it on the Friday it was due because I was working that day, so I completed the test before then. I worked a lot on the first day to finish the pretest to get some extra insight for the test. I completed the paper portion of the test first and then translated that into excel. I will continue to organize my time in this manner because it gave me the whole final day to check over the test.