Peyton Brack
Test 2

1

This test demonstrates my ability to learn concepts related to bernoulli's principle. This test pushed me to think hard about each topic and how it could be related back to bernoulli's principle, while also learning how to apply the equations that are unique to each topic. This test made me strive to understand course topics like force of static and moving fluid, to buoyancy and stability.

2

A

This test was split up into seven different parts from A to G. For part A, comparing my answer to the solution, I saw that my answer was incorrect because I wrote the given slope as 0.01 instead of the 0.001. This was a stupid mental erro that I should have seen. Had I noticed this, I would have found the correct answer of 0.338ft easily.

B

For Part B, I was able to write the free body diagram mostly correct. I misplaced the Ry value so this skewed my thinking for this problem. Velocity was calculated incorrectly, and I did not calculate energy losses. Overall this problem was done sloppy. For next time taking a test, I should slow down and really think about what I should be doing instead of throwing myself head first into the problem.

C

For part C, I believe I manipulated the buoyancy equation incorrectly, and my calculations were doomed to fail because they were based off of a solution from part a. I did not have the length of submerged log or gravity in my final equation, so I should have known the solution would be incorrect. Next time, if I am unsure of my final equation, I should try to manipulate it as much as I can before using it. For stability, I was able to determine that the log was stable but I wasn't able to place the metacenter in the correct spot, so it was more luck than anything else.

D

For this part, I used the correct flow nozzle equation, and assumed a very close Reynolds Number of 2e5, to get a close C value to the correct one. This problem fell apart for me when solving for the pressure change, and my A1/A2 value was incorrect. My C value was 0.987, which is 0.004 from being correct. My page got messy very fast with this part, I will work harder to stay more organized for my next test.

E

For this part I used the appropriate equation for wave speed, but I think I made a mistake when inputting it into excel, so I got a value that was almost exactly three times the actual wave speed. I also had the incorrect velocity, so this threw off my velocity drastically. There was no easy way for me to tell that my numbers were too high, but I should have done research into my answer to see if they were realistic.

F

For this part, I used the incorrect Cd for my first attempt, but then used 2.00 for my second attempt. This was not the attempt shown in excel calculations, and both calculations were incorrect for the drag force. I think I came very close on this problem, but having the incorrect velocity kept this problem out of reach. The incorrect channel depth from part A also hurt me here.

G

For this part, I got the wrong answer because I didn't think to use bernoullis for the pressure of the air, which doomed this problem. For the location I used the current hc equation but I calculated the moment of inertia wrong so the incorrect location was found. I think I missed the mark on this problem because I was very worn down from this test at this point. I need to treat every problem equally from now on and not just give up on some.

WRITING RUBRIC (Applied to the whole test, not to particular problems)

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

PROBLEM 1)

1. Open channel depth (y)	**2/2**
a. Correct equation	1/1
b. Area and Hydraulic radius	1/1
2. Pipe-elbow forces	**0/3**
a. Free body diagram and correct forces	0/1
b. Force in x	0/1
c. Force in y (weight)	0/1

3. Largest wood log **0.5/2**
    a. Size 0/1
    b. Stable? 0.5/1
4. Flow-nozzle flowmeter pressure drop **1.5/2**
    a. Right equation and A1/A2 0.5/2
    b. C value 1/1
5. Water hammer pressure increase **0/2**
    a. Wave velocity (units?) 0/1
    b. Pressure increase 0/1
6. Drag force on a stuck log **0/3**
    a. Correct area 0/1
    b. Correct velocity 1/1
    c. How Cd was obtained? 1/1
7. Force on the flange **0/2**
    a. Magnitude 0/1
    b. Location 0/1
8. Final actual values of the results **0/1**

FINAL GRADE:

10.0+ (80/10)*(2/2 + 0/3 + 0.5/2 + 1.5/2 + 0/2 + 0/3 + 0/2 + 0/1) = 19

4

Some issues I encountered in this test was test fatigue. I encountered this last test so I made sure to spread this test out over a long period of five days. I took lots of breaks so I woulndt get frustrated. One step I took to complete the test was to use example problems from my notes as a reference for some test questions. One concept that I learned about was buoyancy. Even though I was unable to do the buoyancy problem correctly, I think this was my favorite topic covered in this class so far. I think engineers could use buoyancy in ship constructing. It is very important to know how a ship will react once you put it in water. I think I will use this in my future career. I would like to be a marine engineer. I will use the concepts of buoyancy and stability when designing anything that is floating or submerged. These concepts will be very important in my future. Honestly I don't feel improved at all after seeing this test. I feel like my quality of work took a step back compared to the last test, and I believe that will show in my grade. I spent about 10 to 12 hours on this test. I broke it up into intervals of around 2.5 hours a day. I did this to not have one day consumed by this test, and not to be totally burned out.