Test 1 Reflection

This test demonstrated my work towards achieving two of the objectives for this course. The second objective states, “Compute pressure and the forces (magnitude, location, and direction) associate with it in a stagnant fluid.” The first and second question from the exam demonstrated this. The first question required me to find the pressure differential of the compound manometer. To do this, I needed to calculate the pressure in each section of fluid within the monometer due to the height of fluid column and the specific weight of the fluid. The second problem also met this as I needed to calculate the net force on the gate due to the fluid on each side. To do this I needed to find the magnitude and direction of each force to then find the net force. I also needed to find the location of the fluid forces to calculate the force on the support at the top of the gate and on the hinge at the bottom. The third objectives states “Discuss what buoyancy is and determine object stability while floating or submerged in a fluid.” The third question from the exam demonstrated this objective. The third question required that I determine the stability of a cylinder while floating in fluid. To do this, I need to calculate the position of the cylinder in the fluid, location of the center of buoyancy, location of the center of gravity, and location of the metacenter. From there, I could determine if the cylinder was stable or not if the metacenter was located above the center of gravity.

A mistake that I know that I made was on problem 3. When calculating the position of the cylinder, I kept the weight fixed for any length of cylinder. This was not accurate as the weight would not stay fixed and would change with the length of the cylinder that has the specific weight. For example, if you doubled the length of a cylinder, it would weigh twice as much as the original cylinder. The mistake I made was saying that both cylinders would weigh the same. I could have also used the specific weight instead which would have varied the weight of the cylinder with the length of the cylinder. This mistake was at the beginning of the problem, so all my calculations from then on were off. Such as when I calculated the center of buoyancy location and meta center locations. A way that I could have prevented this was studying more about finding the position of an object when floating and doing more example problems. I was a bit pressed for time when I was learning this just before working on the exam. I should have managed my time better so that I could have spent more time doing examples.

PROBLEM 1)

1.	Use gamma*h technique to get deltap?	1/6
2.	Consider that pressure in trapped air is constant?	1/6
3.	Correct use of values with units?	1/6
4.	Correctly considered all fluid levels after oil column goes to 5”?	1/6
5.	Use same equation for deltap?	1/6
6.	Final correct results?	1/6
TOTAL		**6/6**

PROBLEM 2)

1.	Use correct fluid force equation?	1/7
2.	Correct equation for gate force?	1/7
3.	Sum of moment to get force at support (or hinge)? Need correct fluid force location	1/7
4.	Sum of forces to get force at hinge (or support)?	1/7
5.	Correct setup of excel spreadsheet?	1/7
6.	Final correct results	1/7
7.	Final correct plots? One per different cyl diam?	1/7
TOTAL		**7/7**

PROBLEM 3)

1.	Correct eq for submerged distance into the fluid? Use Fb=W	0/7
2.	Correct eqs for locations of center of gravity and center of buoyancy?	1/7
3.	Correct eq for distance to metacenter from center of buoyancy?	1/7
4.	Compare metacenter location to center of gravity location?	1/7
5.	Correct setup of excel spreadsheet?	1/7
6.	Final correct results (stable?)	1/7
7.	Final correct plots? One per different cyl diam?	1/7
TOTAL		**6/7**

FINAL GRADE:

(90/3)*(6/6 + 7/7 + 6/7) = 85.7

I believe my strengths on this exam were calculating the pressure differential in the compound manometer and calculation the forces on the gate. I felt quite sure of my calculations on these questions. My weakness was definitely calculating the stability of the cylinder.

An issue that I encountered was trying to figure out how to calculate the position of the cylinder in fluid when floating. I attempted to troubleshoot this by finding an example in the textbook that was very similar to the problem on the exam. However, I made a mistake in the process. Also, whenever I encountered a question that I didn't fully understand what the question was asking for, I always asked for clarification.

The first step I took was to read all of the questions on the exam to get an idea of what I needed to find. For each question, I start by the writing purpose of the problem. Next, I created a drawing for the problem. Next, I wrote the source and design considerations. Next, I wrote the procedure to figure out the entire process of what I need to do. Then, I complete the calculations following the procedure. After completing the calculations, I wrote the summary stating my results. Then, I stated the materials used in the problem and an analysis. I repeated this process for all 3 problems. After I finished the procedure and calculations by hand for number 2 and 3, I created the excel spreadsheets to be able to complete the calculations for any value as the questions had asked for it.

I have learned several new concepts. I learned how to calculate to pressure due to a column of fluid. I learned to use this in order to find the pressure in pipe by using a manometer. I also learned how to calculate the pressure differential between two pipes using a manometer. I learned how to calculate the fluid force on a horizontal, slanted, curved or vertical wall. I learned how to calculate the buoyancy and stability of an object floating in fluid.

An engineer would use a manometer in a case where they needed to accurately measure small changes in pressure. I don't know of any specific examples, but I can certainly see where this would be important. An engineer would need calculate the force on a surface when designing something as big as a dam. They would need to know the force on the wall of the tank in order to know how strong the wall needs to be and what reinforcements may need to be added. An engineer designing ships would most definitely use the concepts of buoyancy and stability to ensure that the vessel that they design will float and be stable.

I think I would use a manometer when working with pressures that are low or have small changes such as in my future classes or in my future career. I believe I will need to be able to calculate the force on a vertical wall in my professional career such as to design a tank to contain fluids. I would need to know the force in order to determine how thick the wall needs to be or what reinforcements will be needed to contain the fluid. If in my future I found myself in need of designing something that needs to be able to float and be stable, I would definitely need the concepts learned in this unit.

The concepts learned from this test will be important to me in my future professional career as it expands my knowledge base to be able to solve a wide variety of problems. College can't prepare you for everything, but it gives me a basis to build on in the future. I will be able to use this knowledge and research to solve just about any problem I encounter later. I have not been able to apply the concepts yet, but I am sure I will use them in future classes or what I will do for work.

I felt I was most successful and improved most in my abilities in calculating the pressure from the manometer and the force of fluid on the gate from the problems on the test. I can see the course's content intersecting with my career if I am working with fluids in tanks and needing to transport them through piping systems to transport them to another location or processing. I don't know what the future hold for me, but fluids are used in just about every industry which shows its importance for me to learn.

I spent roughly 20 hours on the exam. My time was organized between working on each problem one at a time. I would start by reading the question and writing down what I needed to do. I didn't want to overwhelm myself by looking at the next questions. I tried to allow myself enough to work on the exam so that I wouldn't be stressed by the deadline. I think I should have allotted myself some more time. I started on the exam on Saturday morning and worked on it for about 9 hours and worked about another 11 on Sunday to complete it. I underestimated somewhat how long it would take to finish it and wish I had worked on it for longer on Saturday or managed my time better so that I could have started on Friday.

All in all, I felt good about my performance on the test. I believe I did well and think my grade will represent my understanding of the material. I wish I had spent some more time in some areas so that I was better prepared for the exam. There a some things that I would change and I will use to do better on the future exams.