## Ben Smithson Fluid Mechanics Test reflection

- 1. Overall, the test went alright but I did make a lot of small mistakes that will cost me the correct answer as well as a better grade. With that being said, these mistakes will help me learn and improve on the test taking process for next time as well as building skills for the outside world. To start off, my overall layout of the test looks correct and does show most of the correct process for laying out the work. The first mistake in the layout was my data inputs. Although I was able to input the data throughout the calculations, I did not write all of the data and variables in that section of the test. When starting the calculations, I did the velocity correct, the energy loss correct, as well as the Reynolds number. The first mistakes in calculations was actually with converting the units from lb/in2 to lb/ft3 which was my mistake because I thought that we had to convert the p2 to lb/ft3.This was just an unnecessary step which actually made a calculator error on my part because I did not put the hl included when multiplying by 49.01 lb.ft3. I actually just calculated it and got close to the right answer. My equation was correct and all of the other numbers were right but the units back and forth tripped me up because I was trying to cover too much. For the next test I will pay very close attention to the units and try not to convert the units when it is not necessary. For the next mistake, I forgot to calculate the energy loss and new pressure at the manometer. This mistake cost me the correct height of the manometer. Because of the new pressure that wasn't calculated, and not having enough information in the manometer equation, my height was off. For the second problem, I did get the p1 correct and the process correct. I did not realize that when the fluid was still the manometer was at 0 so I did an unnecessary equation for the second part and the manometer. Finally for the third part of the test, I had a correct curve but my pressures were off because I was basing them off of the first pressure that I got on the test which once again was messed up from a calculator mistake. For the next test to not have this occur again, I am going to make sure to go over the calculations multiple times and make sure that I input all parentheses into my equations. This was a dumb error on my part and I could have gotten more of the pressures in part 3 correct if I had not made the calculator error.
- 2. I would say that my grade would be around a 63.21 because I did the format correctly but made mistakes which caused my pressures to be off. Also, I was not sure about the manometer part of the test so that part, I definitely missed parts on. Finally, I was able to input all of the writing components but the data and variables could have used more work and organization since I did not put all of the data in one place. Based off of the calculations, I would get around a 63 on the test out of 90.

WRITING RUBRIC (APPLIES TO THE WHOLE TEST, NOT TO PARTICULAR PARTS)

1.	Purpose	0.3/10.0 out of 0.5/10.0
2.	Drawings	1.0/10.0 out of 1.0/10.0
3.	Sources	1.0/10.0 out of 1.0/10.0
4.	Design considerations	0.5/10.0 out of 1.0/10.0
5.	Data and variables	0.2/10.0 out of 0.5/10.0
6.	Procedure	1.5/10.0 out of 2.0/10.0
7.	Calculations	1.5/10.0 out of 2.0/10.0
8.	Summary	0.3/10.0 out of 0.5/10.0
9.	Materials	0.5/10.0 out of 0.5/10.0
10.	Analysis	0.5/10.0 out of 1.0/10.0
TOTAL		7.3/10.0 out of 10.0/10.0

## <u>1<sup>st</sup> part)</u>

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)	1/7 out of 1/7
4.	"gamma*h" equation and solve for "h" in manometer	0/7 out of 1/7
5.	Compute pressure at 2 <sup>nd</sup> 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
<u>2<sup>nd</sup> part)</u>		
1.	"gamma*h" equation and solve for air pressure	1/3 out of 1/3
2.	"gamma*h" equation and solve for "h" in manometer	0/3 out of 1/3
3.	Correct results?	0.5/3 out of 1/3
<u>3<sup>rd</sup> part)</u>		
1.	Use spreadsheet from "1 <sup>st</sup> part" to get P1 for diff Q	
N	lake 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?	0.5/4 out of 1/4

## FINAL GRADE:

7.3 + (80/3)\*(5/7 + 1.5/3 + 3.5/4) =63.21

- 3. If I was able to go back in time and take the test again, I would tell myself to GO OVER THE EXAMPLES! This would have helped a lot for the manometer problems and I could have gotten them correct. Also, I would have told myself to check calculations even in the calculator to make sure I did not make a dumb error like I did.
- 4. I have learned to not rely on a calculator, check your work, look at the problems you have accessible to you. For not relying on the calculator, I believe if I went back thoroughly through my calculations then I could have gotten the correct pressure needed. Also, I will need to go over the examples in a way that I can understand the components of each problem and relate them to others that are not necessarily the same problem. Also, I will look at conversions more closely in order to create an easier experience by selecting the correct conversions and only converting when necessary.
- 5. A. I had issues with simple calculation errors as well as selecting the correct formula with the manometer. I had to go into the textbook and examples in order to overcome some of the issues I had on the test.

B. First I was able to complete the pretest for the fluids test. Then I started with the writing portion of the test in order to get going and to try and understand the question and what they are asking. Next I started the calculations but quickly realized that I needed to look at examples from the class and textbook to find out if I was doing each calculation correctly. Next I went through the calculations and checked my work. C. I have learned all new concepts in the first test. I did not know energy losses or Bernoulli's equation for pressure before. I have seen a manometer before but still didn't have the best grasp on it.

D. I believe engineers will use the test question for pumps that need to push the pressure of alcohol through pipes like in water tanks for example. Engineers will need to design the pump and pipes that will not have too much energy loss in order to have a good flow rate through the system.

E. I believe I will be using these equations and systems in engineering if I ever work with companies that need to calculate pressures and flow rates. Examples can be with the fuel pressure in ship engines in the ship yard possibly.

F. I believe this question was important for the professional career of engineers and it was an interesting question overall. If it wasn't in a test format it probably would have been more enjoyable but it was interesting and I'm sure some of us will see something similar in our engineering career.

G. I will use this information in my engineering career but understanding the basic concepts of energy loss and flow rate have already been incorporated in my life because I understand that the pressure of water flowing through something like a sink will be larger than you think because of energy loss through the pipes which is very interesting to me.

H. I have been able to apply some of the concepts in this course to the thermal applications course. Now they are not exactly the same but both classes are dealing with pressure in a machine all of the time.

I. I feel most improved in calculating energy losses and the pressure from bernoullis. I didn't know either of these concepts before the class started and now I can use both to help each other out.

J. As stated before these concepts will mst likely show up in the engineering field depending on where we end up working.

K. I would say I spent a total of 8 hours on the test over the weeks time frame building the pre test, writing portion, and calculations but most of the calculation time was spent finding examples and formulas to make sure that they would come out good. The last part was finding the excel calculations that would work to get the pressures. I would have looked over the examples prior to the test opening so I had a better understanding of the concepts before starting the test.