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MET 330

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Test 1 Reflection

The first exam required the students to demonstrate their knowledge of fluid properties like pressure, velocity, and flow as well as calculating pump power. The first part of the test described a problem that used Bernoulli's equation to solve for losses from point 1 to point 2. The second part of the test included a manometer that reported deferential pressure across a valve. Lastly, an excel file was needed to show our work and determine what the manometer reading would be with half pump power. Course objectives that were covered on Test 1 were "applying the principles of conservation of energy," "define different fluid properties," and "different instruments to measure fluid flow quantities like pressure."

My way of solving for part 1 was slightly different in the way I found the necessary pipe diameter but determined I found the same area as provided on the provided solutions. However, I did not need to solve for pressure in part 1. My losses did not include inlet and exit pipe losses and ultimately is why I did not get the correct solution to part 1. For the second part, I was able to geometrically find the relationship of the given 20 inches for Point A and Point B but used the method of Increment of Pressure and resulting in the incorrect procedure. Despite having incorrect procedures to plug into the excel spreadsheet, the data I used did work as I intended. The setback on the spreadsheet was not understanding the errors I made on part 1 and 2 and

therefore building a calculator that did not produce the correct solutions. Likewise, I did not produce the same plot as the provided solution showed. The professor had both lines plotted on the same chart and used a tool in excel to solve for the ½ power portion of the part 3.

Based on the attached grading criteria, I received a 67.4% on the exam. My strengths of the test were laying out the material in an easy to follow format. My sketches were clear and had all provided information. My challenges revolved around understanding the correct problem solving procedure. In the first part it was not necessary to solve for pressure, I found that out only after calculating the energy losses separately. In part 2, it was more straightforward than I made it.

Some of the points in the exam when I was stuck or even thought I had completed the portion of the test successfully, I would take a break and return to find I had not done the previously part correctly or skipped a step. I was helpful to work on the exam over a few days. Due to my work schedule and the class project I was unable to get started in the exam for a few days into the available time we had; it's critical I start immediately. Concepts that were picked up and will carry on through the semester is losses in the pipe and picking the correct points of the system to use as calculations. I use this information on a daily basis in my current job as a Mechanical/Piping Systems Designer. For example, I am tying into an existing dust collection system for a new pneumatic conveying system. There are several characteristics of the service that require fluid mechanics to understand and successfully design for. The product uses blowers to pull dust particles through hundreds of feet of thin wall tubing to a dust collector. The branches I am tying into go back to a header with blast gates (for system

balancing) that increase diameter as it goes to keep velocity at the needed amount so the product does not fall out of the vacuum flow. I look forward to applying these new concepts to my current and future projects at work.

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

PART 1)		My Grade
1. Select pipe diameter	1/7	1/7
2. Use Bernoulli's to get ha (ref & points in pict.)	1/7	1/7
3. Pipe energy losses	1/7	1/7
4. Minor losses	2/7	1.5/7
5. Pump power with efficiency	1/7	1/7
6. Correct results	1/7	0/7
Total	7/7	**5.5/7**

PART 2)		My Grade
1. Use geometrical relation	2/6	1/6
2. Use gamma*h procedure	1/6	1/6
3. Proper manipulation of eqs and solve for "h"	2/6	1.5/6
4. Correct results?	1/6	0/6
Total	6/6	**4/6**

PART 3)		
1. Use spreadsheet from previous parts to get pump power (P) for diff Q. Did losses change with Q?	1/5	1/5
2. Plot pump power (P) vs Q	1/5	1/5
3. Read Q for pump power equal to ½P in part 1	1/5	.5/5
4. What is the new manometer reading?	1/5	1/5
4. Correct results?	1/5	0/5
Total	5/5	**3.5/5**

Total: 10+(80/3)*(7/7+6/6+5/5) = 90

My Grade: 10+(80/3)*(5.5/7+4/6+3.5/5) = **67.4**