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02/20/2022

MET 330

Professor Ayala

Test 1 Reflection

Introduction:

Test 1 covered two major topics, pressure measurement in a manometer, and energy loss in a system. Pressure measurement will be used in an engineering job that works with fluids, a manometer may be used to measure the pressure of a system at a point and knowing what kins of manometer fluid would work best for a given range of pressures. Although there are easier devices to measure pressure it is still good information to have in case a manometer is the only device available. If an engineer is working with a system of pipes energy loss will always need to be considered. Even an engineer that doesn't work on piping systems all the time should know how to get a decent approximation for the energy loss in a piping system if they ever have a project that encompasses a system of pipes.

Problem 1:

In this problem I was able to identify how to correctly solve for the height of the fluid in the manometer. The only reason why my answer was off from the posted solution was I did not use a constant temperature. This is a mistake that led me to using slightly different specific weights and lead to an answer that was 0.1 ft off. In the future I will make sure that I include a standard temperature so I can calculate a more accurate solution.

Problem 2:

This problem had a lot more parts to it and there was more room for error in these questions. Using the given Q and velocity I was able to calculate the correct pipe size for the system. I was surprised that I accounted for the correct energy losses (only due to the bottom and right had side of the system). The velocity that I calculated for was about 0.4 ft/s less than the one used in the solution, so my total energy loss was about 3 ft less than the solution. This led to the calculated power of my pump needing to be 0.04 hp less than the solution which is very close but slightly off. Determining the pump power and energy loss in the system is where I feel I was most successful in this problem. My largest mistake was made when calculating the pressure head at the inlet of the pump, I added the pump energy to that equation and subtracted the energy loss, when I should have only been subtracting the energy loss with the kinetic energy and change in height. This inflated my pressure to be 8.2 psi, the solution was -12.6 kPa (-1.8 psi), by looking at the system I should have been able to figure out that the pressure in the bottom pipe would have to be negative since it is being sucked into the pump, but I didn't not catch that mistake. I will be doing more thorough review of my work before submitting from now on. The last large mistake that was made in this problem was the installation cost of the pipe, the solutions was much lower than mine and I can only assume that would be because the solution only used the

pipe on the bottom and the right side and ignored the top lefthand piping that was running to the machines, this could be made clearer in the questions, I was not entirely sure how much of the system we were replacing. This just inflated my total cost since my operating cost was close to that of the solution.

Summary:

This test forced me to think outside the box with the use of some equations, manipulating the gamma times h equation in the first problem made me really understand this equation. This question was not overly difficult, and I think it makes for good testing material. The second question was daunting at first but if the steps are followed it can be completed. I feel that there could have been clearer and talking in class about open systems and what kinds of energy loss occur, and what forces the pump must overcome. I was able to figure out that in this system only the right and bottom portions contributed to the energy loss the pump would have to overcome, but I was taking a shot in the dark and did not feel 100% confidant in it.

Grading Rubric:

Writing,

1.	Purpose	0.5/10
2.	Drawing	1.0/10
3.	Sources	1.0/10
4.	Design considerations	0.5/10
5.	Data and variables	0.3/10
6.	Procedure	2.0/10
7.	Calculations	1.5/10
8.	Summary	0.5/10
9.	Materials	0.5/10
10.	Analysis	1.0/10

Total 8.8/10

Problem 1,

1.	Identify all unknown dimensions n drawing	1.0/7
2.	Cancel the distance with water	1.0/7
3.	Solve for gasoline distance	1.0/7
4.	Correct excel spreadsheet	0.5/7
5.	Using excel, get mercury case	1.0/7
6.	Why results make sense and manometer length	0.5/7
7.	Final results	1.0/7

Total 6/7

Problem 2,

1. Select pipe diameter using 3m/s 1.0/9
2. Compute all energy losses 1.0/9
3. H_A and pump power 1.0/9
4. Pressure at pump inlet 0.0/9
5. Correct excel spreadsheet 1.0/9
6. Pump power for 4 other pipe sizes 1.0/9
7. Installation, operating, and total costs 0.5/9
8. What is best pipe diameter? 1.0/9
9. Final results 1.0/9

Total 7.5

Final Grade: 76.4%