# Test 1 Reflection

PART 1.

The primary goal of the course's first exam was to test the application of Bernoulli's equation and the calculation of head loss in designing a pipeline system for transporting gasoline from a storage tank to a truck. The exam also assessed the ability to design a U-tube manometer using the equation for static fluid pressure changes and to use volumetric geometry to determine the necessary tank size to meet specific requirements.

PART 2.

In Part 1A of the exam, I made a few mistakes while calculating the velocity and head loss in a pipe system. Firstly, I used the area of a circle equation to calculate the area of the pipe, whereas the solution used the flow area from the tables in the textbook, resulting in a slightly different velocity value. Secondly, I used the Reynolds number and relative roughness to obtain the friction factor from the Moody chart, whereas the solution used the friction factor for turbulent flow, leading to a different friction factor for pipe friction. As a result, the head loss due to pipe friction was around 6.5% different from the solution. Additionally, I made an error while calculating the head loss for the elbow by choosing the K constant for a 90 degrees long radius elbow instead of the K constant for a 90 degrees elbow with a 30ft radius. This resulted in a 6.2% difference in the calculated value for minor losses. Finally, I neglected the 0.5m length going down while computing for "h" with Bernoulli's equation, leading to a 7.4% difference in the depth of gasoline for a fluid flow rate of 400gpm.

To avoid making these mistakes in the future, I would use the correct property for flow area, calculate the friction factor using the equation for more accurate values, and have a better understanding of the different types of pipe fittings. I would also ask clarifying questions to ensure that I use the correct pipe fitting values. Moreover, I would not neglect any vertical distances while computing for "h."

In Part 1B, I made a mistake by not accounting for the location of the u-tube manometer. I used the gamma(gasoline)(h) equation to calculate the pressure at the bottom of the tank and then used this pressure to determine the maximum height difference the mercury would create. While I made the right side of the manometer slightly longer to prevent it from overflowing out of the tubing, I should have accounted for the location of the u-tube manometer to avoid this mistake.

In Part 1C, since I got a different depth value than the solution in Part 1A, I also got a different tank diameter value. To prevent this mistake in the future, I would use the correct property of flow area.

Finally, in Part 2, I made some mistakes while creating a graph and organizing my Excel sheet. To avoid making these mistakes, I would practice using Excel more often and remember the "$" trick. Overall, I learned from my mistakes and would take steps to avoid making them in the future.

PART 3

If I were to evaluate my performance on the test, I would give myself a score of 40%. I acknowledge that I made several mistakes due to my impatience and haste. I did not take my time to thoroughly review my work and as a result, I overlooked some important steps and processes that should have been identified.

Furthermore, I need to improve my attention to detail and focus on ensuring that I am accurately applying the concepts and formulas learned in class. For instance, I need to double-check my calculations and ensure that I am using the appropriate units and values for each variable.

Additionally, I struggled with using Excel, and I need to dedicate more time to practice and become more proficient with the software. This will enable me to better organize my work and create clearer and more informative graphs.

Overall, while my performance on this test was not up to my expectations, I recognize the areas that I need to improve on, and I am committed to putting in the effort to enhance my skills and knowledge in the subject matter.

PART 4

A. Despite the challenges I faced in understanding the concepts of Bernoulli's Theorem and ensuring the accuracy of my equations, I persisted with confidence and determination. Although it was a stressful experience, I relied on my notes and persevered through the difficult moments. Ultimately, my efforts paid off, and I was able to overcome the obstacles that once seemed insurmountable. Through this experience, I gained valuable knowledge and a sense of accomplishment, proving to myself that with hard work and dedication, even the most complex concepts can be mastered.
B. When faced with a problem, my approach typically begins with trying to visualize the system and the requirements. I find it helpful to create a drawing that represents the problem, which helps me to understand the underlying concepts and equations needed to solve it. Once I have a clear understanding of the problem, I proceed to tackle it step by step using notes taken during class. However, upon reflection, I realize that my approach could be improved if I were to take more time to write out my thought processes before beginning to solve the problem. By doing this, I could better organize my approach and have a clear plan to follow, rather than just diving into the problem. This would help me to stay focused and avoid getting sidetracked during the problem-solving process. Overall, I believe that taking a more intentional and structured approach to problem-solving will improve my efficiency and accuracy.
C. In fluid mechanics, Bernoulli's Equation is a fundamental principle relating pressure, velocity, and elevation of fluids in a system. However, relying solely on the equation and solving problems blindly is insufficient. It's essential to approach fluid problems logically and reasonably by breaking them down into smaller parts to analyze each component's contribution to the system. This approach leads to a deeper understanding of the system's behavior and more accurate predictions. By understanding the underlying principles and assumptions made in equations, one can avoid inaccuracies and oversights in solutions. Thus, a logical approach is crucial in understanding fluid mechanics, not just Bernoulli's Equation.

D. These concepts used in the test would be used to design a tank using gravity to produce a desired flow rate at a filling station or factory: The knowledge gained from the test can be applied in real-life scenarios where a tank needs to be designed to control the flow rate. By utilizing gravity, the tank can be designed to maintain a constant flow rate at a filling station or factory. The concepts learned can be instrumental in designing the tank to achieve the desired flow rate and ensure the system's smooth operation.

E. I would not use these concepts anywhere as of now nowhere, but I will always keep these concepts in my mind: While the concepts may not be immediately useful, it is essential to keep the knowledge gained in mind. The principles of fluid mechanics are fundamental to many engineering applications and can be applied in various fields in the future. It is crucial to have a sound understanding of the concepts to be able to apply them effectively when the opportunity arises.

F. As of now, I would use these concepts in my career :While the specific concepts may not be applicable to the current job, having a solid understanding of fluid mechanics and related concepts is vital for any engineer. The knowledge gained in the test can be used to solve complex problems in the future, even if they are not directly related to the current job.

G. I could use this concept to create an irrigation tank in a garden that does not use any pumps: The knowledge gained from the test can be applied to design an irrigation tank that relies on gravity rather than pumps. This can be particularly useful in gardens or farms, where a steady supply of water is required, but electricity may not be readily available. The concepts learned can be used to design a tank that can deliver a constant flow of water to the crops while using the force of gravity to move the water.

H. I haven't been able to utilize these principles in the outside world yet: While the concepts may not have been put to use in the real world, it is essential to keep in mind that the knowledge gained can be applied in various situations. The principles of fluid mechanics are fundamental to many engineering applications, and the concepts learned in the test can be used to solve complex problems in the future.

I. I am always stressed with a short question test because each question is worth so much, but I calm myself and tell myself to do the best I can: Short question tests can be daunting, and the pressure to perform well can cause stress and anxiety. However, it is crucial to remain calm and focused during the test and do the best one can. By staying calm and collected, one can approach the questions systematically and apply the knowledge gained effectively.

J. As of now, I do not see these concepts interacting with my future career because I plan to work on the airplane technology side of engineering: While the specific concepts may not be directly related to the future career path, having a solid foundation in fluid mechanics is essential for any engineer. The knowledge gained from the test can be applied in many different fields, and having a thorough understanding of the concepts can help solve complex problems in the future.