**Self-Grade Assessment Test Three:**

1st PROBLEM)

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|---|---|
| 1. Label branches and put reference | 1/8 out of 1/8 |
| 2. Apply Bernoulli's correctly and get two equation | 2/8 out of 2/8 |
| 3. Define energy losses for both branches | 2/8 out of 2/8 |
| 4. Get flow rate (iteration process) | 2/8 out of 2/8 |
| 5. Correct results? | 1/8 out of 1/8 |

2nd PROBLEM

| | |
|---|---|
| 1. Label new branches | 1/6 out of 1/6 |
| 2. Get new third equation | 1/6 out of 1/6 |
| 3. Modify conservation of mass equation | 1/6 out of 1/6 |
| 4. Manipulate equations appropriately | 1/6 out of 1/6 |
| 5. Get flow rate (iteration process) | 1/6 out of 1/6 |
| 6. Correct results? | 1/6 out of 1/6 |

FINAL GRADE:

If getting everything right:

**(90/2)*(8/8 + 6/6) = 90**

**(90/2)*(7/8 + 4/6) = 69.4**

| **KEY** |
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| Complete |
| Wrong/Incomplete |
| Final Grade without homework |

**Test Reflection Questions:**

1. In reference to the course objectives, the first question asked to calculate the total flow rate in the system. For this, the first learning objective required was the usage of Bernoulli's equation. Identifying Bernoulli's equation is necessary for a parallel network given in both exam questions. This parallel network that included the friction losses in the pipes, valve, entrance, and elbow loss es was obtained in the learning objectives. We also applied the conservation of energy to solve for the total flow rate.
2. In the first question, I had the correct thought process. My Bernoulli equation was set up correctly, along with my reference and points of interest. For my head losses on the upper pipe, I had labeled all of my energy losses correctly except for the T. I also could have made the algebra easier if I had simplified my values earlier on in my equation for Q1 and Q2. My iteration process was also correct. Mostly, I made the one mistake of neglecting the T due to a lack of visualization on my end. For the second question, I implemented the correct modification of energy conservation. I ran into issues with the neglect of the T and the algebra. To prevent this from further occurring, I will plug in my values earlier on in the equation. I also shouldn't have neglected the iteration for Q1 at the beginning of the problem. If I were to retake this exam, I would carry out the same process, given that it was not wrong. I would mostly have paid more attention to visualizing the location of the T for minor losses and plugged in my values earlier on to simplify rather than simplifying with the variables.
3. The chart listed above is titled Self-Grade Assessment Test Three. The strengths of my test consisted of my ability to follow the correct procedures for solving for Q1 and Q2 to iterate QT. My weaknesses in the test occurred from not simplifying the terms earlier on in developing my equations for Q1 and Q2.
4. Answers to the following questions in part four.
    a. I did not necessarily have any issues with taking this exam. I felt I knew how to solve each problem as I thought about the process rather than comparing it to problems solved in class.
    b. My process for completing the exam was very well organized. I arranged my time well to allow enough breaks to arrange my thoughts.
    c. I learned how to solve a pipeline problem, which shows I know how to use Bernoulli's equation and solve series pipeline problems correctly.
    d. When engineers design specific systems for customers, the customer may have a preferred flow rate. To designate this specific flow rate, the engineer can either create a pipeline design and see how these modifications affect the flow rate or place other options like valves in the pipeline for customers to adjust the flow rate for their preferred value.
    e. I can use everything I learned in this exam if I ever were to build my own house and want a specific velocity or flow rate entering specific locations in my home.

f. I think what I learned is essential for my professional career; after I get out of the Navy, I would like to work as a mechanical engineer or engineering manager I believe knowing how to adjust specific items in fluid systems is crucial.
g. I can use this information in a surface warfare engineering duty officer when seeking specific flow rates throughout systems aboard a ship.
h. I have not been able to apply any concepts in other current courses I am currently taking.
i. I felt I was most successful when setting up the problem. I carried out each procedure correctly by incorporating energy conservation and Bernoulli's equation. I improved a lot at identifying the major and minor losses in the problem.
j. Eventually, I would like to work at Lockheed Martin to design and manufacture aircraft. Understanding pressure and, most importantly, Bernoulli's principle takes part in designing these aircraft.
k. I spent around 10 hours on this exam. I organized my time well and would not do anything differently.