<u>WRITING RUBRIC </u>(APPLIES TO THE WHOLE TEST, NOT TO PARTICULAR PARTS)

1. Purpose   0.5/10.0 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   1.0/10.0 out of 1.0/10.0
5. Data and variables   0.5/10.0 out of 0.5/10.0
6. Procedure   2.0/10.0 out of 2.0/10.0
7. Calculations   2.0/10.0 out of 2.0/10.0
8. Summary   0.5/10.0 out of 0.5/10.0
9. Materials   0.5/10.0 out of 0.5/10.0
10. Analysis   1.0/10.0 out of 1.0/10.0
      TOTAL   **10.0/10.0 out of 10.0/10.0**

<u>Part 1a)</u>

1. Show drawing with Bernoulli's points and reference   1/8 out of 1/8
2. Apply Bernoulli's, simplify it, and solve for "h"   0.75/8 out of 1/8
3. Compute velocity with Q=VA   1/8 out of 1/8
4. Compute pipe energy losses correctly (estimate L)   1/8 out of 2/8
5. Compute minor energy losses correctly   0.5/8 out of 1/8
6. Create spreadsheet with all calculations   0/8 out of 1/8
7. Correct results?   0.25/8 out of 1/8

<u>Part 1b)</u>

1. Select U-tube tubing diameter   0.25/6 out of 1/6
2. Decide U-tube right leg length   0.5/6 out of 1/6
3. Apply "gamma*h" equation and solve for "h" of Hg   1/6 out of 2/6
4. Mass or volume of required mercury   0.75/6 out of 1/6
5. Correct results?   0.25/6 out of 1/6

<u>Part 1c)</u>

1. Compute transferred volume in 5 minutes   0.5/4 out of 1/4
2. Use cylinder volume equation and get tank diameter   0.5/4 out of 1/4
3. Compute percentage of the energy losses   0.5/4 out of 1/4
4. Correct results?   0.5/4 out of 1/4

<u>Part 2)</u>

1. Use spreadsheet from "Part 1" to get "h" for diff Q
      Make sure the K value or Leq value of valve changed
      Make sure energy losses change when changing Q   0/8 out of 2/8

2. Plot "h" vs Q   0/8 out of 1/8
3. Read Q for "h" equal to the "h" in part 1   0.5/8 out of 1/8
4. What is the new manometer reading?   0.5/8 out of 1/8
5. %drop of the gasoline level after 10 minutes   0.5/8 out of 1/8
6. Compute percentage of the energy losses   0.5/8 out of 1/8
7. Correct results?   0.5/8 out of 1/8

FINAL GRADE:

10 + (80/4)*(4.5/8 + 2.75/6 + 2/4 + 2.5/8) = 46.7