BACKGROUND
A Venturimeter is a tube with a constricted throat section that increases velocity and decreases pressure (Figure 1). Venturimeters are used for measuring the flowrate of both compressible and incompressible fluids in a pipeline.

![Figure 1. Ideal Conditions for venturimeter](image)

Using the continuity and energy equations between the upstream section (cross-section A) and the throat (narrowest pipe section – cross-section D) it can be shown that:

\[
Q = C_d A_d \sqrt{\frac{2g(h_A - h_D)}{1 - \frac{A_d}{A_A}}}
\]

where, \(D_A=26\text{mm}, D_D=16\text{mm}\) (Diameters for each section)

\(Q_{\text{actual}}\): Actual discharge, \(Q_{\text{theory}}\): Theoretical discharge, \(C_d\): Discharge coefficient, \(h_A\): Head at the upstream section, \(h_D\): Head at the throat section, \(A_A\): Pipe cross sectional area at the upstream section, \(A_D\): Pipe cross-sectional area at the throat section.

The discharge coefficient \((C_d)\), In other words the coefficient of the Venturimeter, typically has a value between 0 and 1. The actual value is dependent on a given Venturimeter, and then it may change with flowrate.

CALCULATIONS

1. Read the piezometric heights in each section. Fill the table given below.

<table>
<thead>
<tr>
<th>Experiment 1</th>
<th>Piezometric</th>
<th>Actual</th>
<th>Area (m²)</th>
<th>Velocity head</th>
</tr>
</thead>
</table>
2. Give brief explanation about venturimeters and experimental setup.

3. Use Bernoulli equation to calculate the velocity at the throat section ($V_D$). **Discuss and compare your result.**

4. Compute $Q_{actual}$ and $Q_{theory}$. Find the discharge coefficient ($C_d$) for both experiments. **Discuss your result.**

5. Do you have any suggestions for improving this apparatuses.

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Include all 5 answers in your report....