### Observation Table

<table>
<thead>
<tr>
<th>S. No</th>
<th>Distance between slit and screen D (cm)</th>
<th>Width of the central maxima b (cm)</th>
<th>Width of slit (d = 2D \frac{a}{b} \text{ (cm)})</th>
<th>Mean (d) (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>50.5</td>
<td>0.45</td>
<td>0.015</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>65.5</td>
<td>0.50</td>
<td>0.017</td>
<td>0.015</td>
</tr>
<tr>
<td>3.</td>
<td>45</td>
<td>0.40</td>
<td>0.015</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Mean} = \frac{0.015 + 0.017 + 0.015}{3} = 0.015 \text{ cm}
\]

\[
\text{Least count} = \frac{5}{10} \times \frac{1}{50} = 0.01 \text{ mm} = 0.001 \text{ cm}
\]

\[
T.R = H.S + V.S \times L.C
\]

\[
= 0 + 1 \times 0.001 = 0.01
\]
Aim: To determine the width of a narrow slit using diode laser.

Apparatus: Variable single slit, Optical bench with stands, diode laser, screen, graph paper, pen etc.

Formula used: The width of the slit \( d \) is calculated from the Fraunhofer diffraction pattern as,

\[
d = \frac{2 \pi D}{b} \quad (\lambda = 6.70 \times 10^{-7} \text{ cm})
\]

where \( D \) is the distance from the slit to the screen, \( b \) is the width of the central maximum on the screen and \( \lambda \) is the wavelength of light.

Result: Width of slit \( d = \frac{2 \pi \lambda}{b} \)

\[
= 0.01 \text{ cm}
\]

Precaution
(i) Slit should be vertical and straight.
(ii) Distance between the slit and laser should be as small as possible.
(iii) Distance between the slit and the screen should be as large as possible.