

The aim of this experiment is to determine the critical angle of the given glass block.

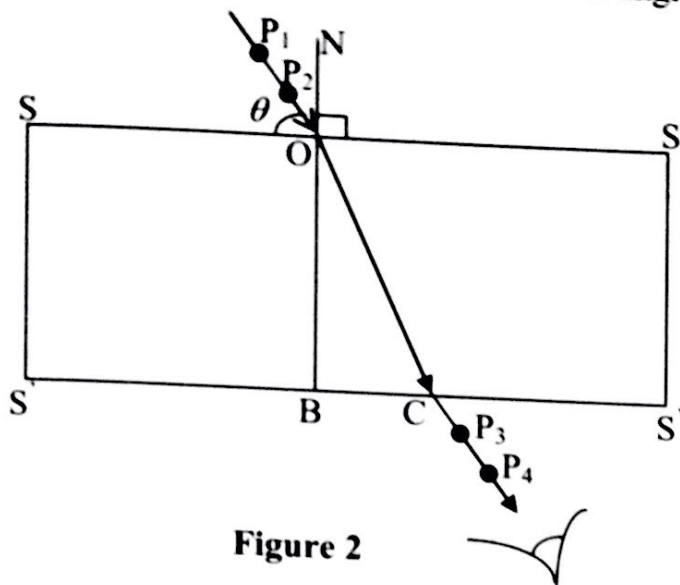


Figure 2

Proceed as follows:

Place the rectangular glass block on the drawing board. Use a sharp pencil to trace the outline of the block. Remove the block and draw the normal NOB near the left end of the block (see Figure 2 above).

Draw a line making angle θ of 20° with the surface SS of the block. Erect two pins P_1 and P_2 on this line at about 5cm apart. Place the block back in its place and erect more pins P_3 and P_4 at positions which appear to be in a straight line with the other two pins as seen through the block. Again remove the block and draw the complete path of the ray (see Figure 2). Measure the distances BC and OC.

Repeat this procedure for values of angle θ equal to 30° , 40° , 50° and 60° and in each case make your drawing on a fresh part of the drawing paper.

- Record clearly the values of θ , BC, OC, $\frac{BC}{OC}$ and $\cos \theta$ in a tabular form.
- Plot a graph of $\frac{BC}{OC}$ against $\cos \theta$.
- State the nature of the graph.
- Find the slope S of the graph.
- Calculate the reciprocal of the slope.
- Comment on the value obtained in 2 (e).
- From the graph, determine the value of $\cos \theta$ when $\frac{BC}{OC} = 0.15$.
- Calculate the value of critical angle C, given that $S = \sin C$.
- State any two sources of errors.
- State two precautions to be taken in this experiment.

(25 marks)